The IRON AGE

Vol. 163, No. 21 June 2, 1949

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100 E. 42nd ST., NEW YORK 17, N. Y.
ESTABLISHED 1855

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June 2, 1949

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"I Would"

WHEN Congressman Elkton asked David E. Lilienthal, Atomic Commission Chairman: "Even if you knew this man . . . was a Communist, what would you do?" the latter responded: "I would keep him in school."

"So you would keep a Communist in school," continued the Congressman, "and let the government pay?"

"I would," replied Lilienthal.

This former Chairman of the TVA takes pride in his own enlightenment. He is generally regarded as a 24 carat liberal, a typical knight in burnished armor riding a white charger, prone to lecture Congressmen on liberalism. He believes in "affirmative democracy," a coy euphemism for paternalism. We believe that within the limitations of the principles he professes he is intellectually honest. He is not a crackpot.

Nevertheless, he is willing to use the money of American taxpayers to subsidize the education of a man who has been nurtured in disloyalty, whose life is dedicated to treason, whose success in jeopardizing the freedom of our institutions would be rewarded by the accolade of an alien master.

All this is known to David Lilienthal. It is known to thousands of other public officials, scholars, preachers, and softboiled intellectuals who wouldn't dream of exposing their children to smallpox but are perfectly willing to expose them to a social danger which will make them all the helpless stooges of a master state.

Part of this attitude is due to the tradition of tolerance which is one of the main props of American freedom. We want the other fellow to say what he pleases, worship in the light of his own conscience and enjoy the right of protest. It is all part of the Bill of Rights and that personal freedom recognized in law, scholarship and religion. We would not change this. Our esteem for this precious freedom is no less than that of David Lilienthal or the members of our college faculties.

On the other hand, rights in any society must be qualified. They may never be absolute. None have been more assiduous in exploiting "essential distinctions" than the learned gentlemen who rush to the aid of every communist whose capacity for mischief is about to be sterilized by exposure or expulsion. Personal freedom does not extend to murder, robbery and assault. There is nothing in the Constitution, in our traditions of sportsmanship and learning, which tolerates treason.

Our honest liberals properly fear the pressures for conformity which always operate in any group. They recognize that progress often comes from the courageous deviations and bold mutations of the unusual individual, from a Galileo, a Newton, a Luther, a Columbus; that such men are often persecuted because they fail to follow established patterns of conduct.

Yet if we are intelligent we must subject the activities of our nonconformists to some test of purpose and effect. When the primary purpose of the non-conformist is to deny the very freedom which makes his non-conformity possible, when his success would destroy our institutions, halt material progress, and place his own country under the domination of a foreign power, is this not a proper point to limit the borders of tolerance and recognize here, as we do elsewhere, the distinction between freedom and license? We hold that suicide is repugnant to our Creator and that this applies to nations no less than to individuals.

Joseph Stagg Lawrence

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Although we stock no talking steels, we put Ryerson alloys through conclusive hardenability tests—literally make every heat in our stocks reveal every essential fact about itself. Then we carefully record the information on a Ryerson Alloy Certificate delivered with the steel.

Because we make our alloys tell all, you're able to specify and buy the safe way—on the basis of hardenability. Because we send a Ryerson Alloy Certificate with every shipment, your heat treaters are provided with the information they need to do a quick, accurate job.

Large stocks of Ryerson certified alloys are in stock for immediate delivery. When you want quick shipment of any alloy requirement call your nearest Ryerson plant.

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► A technique for reducing smoke from coking operations, particularly with older furnaces, which would not require major capital outlays, would be enthusiastically welcomed by steel executives. Coke ovens, especially during the charging period, are one of the knottiest phases of the smoke control problem facing the industry.

► The tempo of shipbuilding in the Scandinavian countries is one reason for the bright outlook of some U. S. firms in the export business. At the same time, British shipbuilding orders are falling off. Spreading unemployment is expected there. Comment often heard is that removal of government subsidies on steel came at a bad time.

► Application of strain gages to double-edge straight edges used in grinding machine tables gives a degree of precision never before attained. This is accomplished by being able to measure the slight curvatures due to the unavoidable flexibility.

► In many fields the lower prices being expected by consumers have been made difficult if not impossible to put into effect because of the long period of inventory reductions. With orders and operations down, some manufacturers find that even current prices don't permit them to break even. Part of the difficulty is to be found in the war and postwar expanded production facilities.

► Equipment has been developed for production of soil pipe in sand-lined molds at the high rate of 250 per hour per machine. At this rate of production, coupled with conservation of space and manpower, it can be expected that the development will cause big changes in the soil pipe foundry industry.

► French annual production of 2000 tons of aluminum foil will be more than doubled by the fall of 1950. Two rolling mills are to be built with ECA funds and American machinery at a cost of nearly $2 million each. Most of the equipment will be purchased through a New York firm.

► It looks as if captive mines of the steel industry will be out in front on wage negotiations this year. For the first time in many years, meetings will probably take place with steel industry representatives before commercial mines set the pace.

In the dim past captive mines agreed to the general terms of the commercial meetings. As economic conditions changed, John L. Lewis used the captive mines as a means to help get his demands. When the captive mines were struck steel output was usually adversely affected. This in turn made a national crisis.

This year most steel firms have ample supplies of coal to withstand a long coal strike. But it may not come if the captive mines, with U. S. Steel being the first to meet with Mr. Lewis, reach an early agreement without waiting for the general agreement—if any—among commercial mines.

► Small underground plants may not be too far in the future. Proposals are under study to the effect that selected new mines should be developed along lines suggested by the defense agencies, the extra cost to be defrayed by the government. In case of attack, factories could be moved in—safe from bombing.

► Top steel people aren't convinced that inventory reduction by their customers is a real thing; that it means lower output soon and that it won't let up until customers are sure they have gotten rid of all high priced material. Steel users look for lower steel prices even though steel officials have repeatedly shown that no lower base prices are in prospect. Until steel customers have reduced large inventories and are sure there will be no drastic price cuts, extreme caution will rule in buying of steel.

► Relaxing of export controls has thrown merchants and brokers into direct competition with mills. Under the rigid quota system export licenses were divided between mill and merchant approximately in a 60-40 ratio. Some, who at first favored relaxing of controls, are vulnerable competitively. Such firms will sorely miss the protection provided by the previous arrangement.

► The dimmer outlook for steel may be bad news for the steel union's chances for large-scale concessions this year. There now seems little chance of a straight cents-per-hour increase. Nor is any tangible progress expected on pensions. Union's best chance this year is to get a moderately good social security package. Studies and negotiations on this matter have been in progress for 2 years. A conclusion probably will be reached in the union's favor despite general business conditions.

Automatic Transfer Presses Increase Stamping Output

For producing 150 electric ranges an hour, Hotpoint installed four Verson transfer feed presses for stamping range drawers, reflector rings and drip pans, for what is one of the most modern transfer feed press installations in this country. The operation, part transfer, and die arrangement for this station method of stamping are described.

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By E. E. SCHROEDER
Vice-president, Manufacturing, Hotpoint, Inc., Chicago

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WHEN the decision was made to tool up for the production line manufacture of electric kitchen ranges, Hotpoint concluded that some of the required metal stampings would have to be made on completely automatic, high production presses. A manufacturing schedule of 2400 electric ranges per 16 hr day meant that press shop operations would have to furnish 4800 drawers, 9600 reflector rings and 9600 drip pans to meet this schedule.

To take care of the drawer, ring and pan production, four Verson transfer feed presses were installed. These presses can perform multiple operations consecutively and simultaneously. They are equipped with single main slides on which are mounted individual slides for each die station. These individual slides are independently adjustable for setting die unit. With each station constructed as a separate unit, it is relatively simple to remove dies for repairing, regrinding or refinishing. When the individual slides are removed, any single die or a number of dies can be mounted on the main slide and the press can be used for any job within its capacity.

The Verson presses at Hotpoint accommodate individual pneumatic die cushions and pressure pads at each station if needed. This permits proper cushion capacity for each die and has permitted doing work in a single drawing operation that ordinarily would have required two dies and two operations. With these completely automatic units, the press cycle on each and every station is so synchronized that it is impossible to damage dies or parts should anything go wrong. The dies are all positive action, cam operated.

The largest press, shown in fig. 1, weighs 270 tons and is capable of exerting a maximum developed thrust of 450 net tons. The press extends 27 ft above the floor, and the pit in which the press foundation rests is 13 ft deep, 21½ ft long and 17 ft wide. This press is used to make electric range drawers.

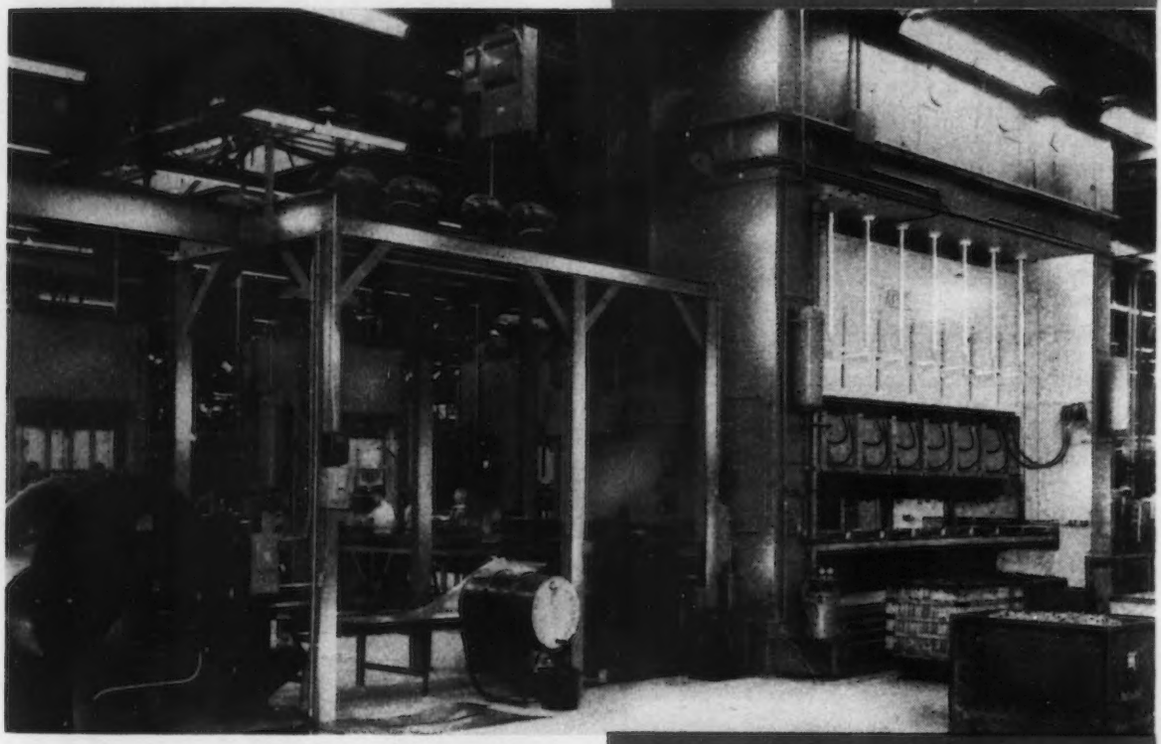
Coiled sheet steel of deep drawing quality, 0.037 in. thick by 31 in. wide, is automatically fed into the press from the reels shown on the entrance side in fig. 1. The stock passes through a roller leveler prior to entering the first die. Coils weighing up to 10 tons can be handled with

this equipment. The feed is about 22 fpm and the press makes 420 drawers an hr, which means it consumes 2 tons of steel per hr.

An automatic transfer feed slide, synchronized with the operating press cycle, transfers the part from one die to the next. The transfer mechanism consists of two aluminum channel bars to which are attached fingers for grasping the piece and moving it forward a distance of one station. The bars are mounted one at the back and one at the front of the dies. They operate in a rectangular motion in a horizontal plane. The first motion is toward the center line of the press to grasp the piece. The bars then move in forward, each set of fingers moving a piece one station and placing it in its proper position for the next operation. The bars and fingers then release the piece, retracting from the center of the press, and move back to the original position, where they are ready for the next cycle. Movements of the transfer feed bars and fingers are synchronized with the motion of the slide so that they get in and out of the working area at the proper time.

The transfer slide is operated by three separate de electric motors. Two motors control the feed of the fingers in and out while another motor controls the forward and backward motion of the slide. These motors start and stop on each cycle of the press and are controlled by a motor generator set.

One operator handles the entire press operation and the controls are such that as long as the operator is within reach of the press itself, it can be stopped should anything go wrong. This particular press was custom built for the application and has six pneumatic die cushions with capacities ranging from 20 to 63 tons. These lower die cushions have a maximum stroke of



ABOVE

FIG. 1—This eight station Verson transfer press is used in drawing the drawers of the new Hotpoint electric range. The press is coil fed at a rate of 22 fpm and will produce about 420 drawers an hr.

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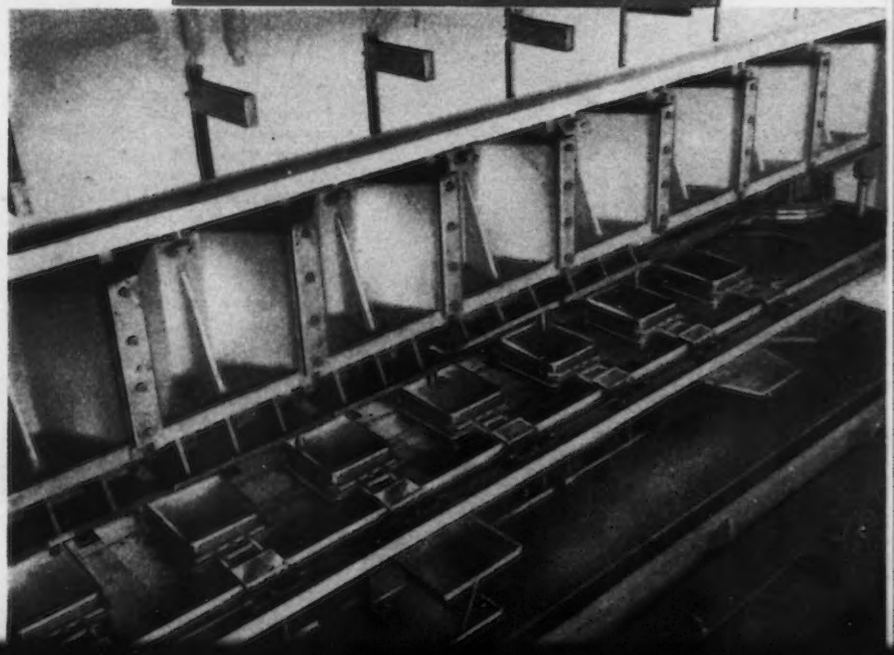
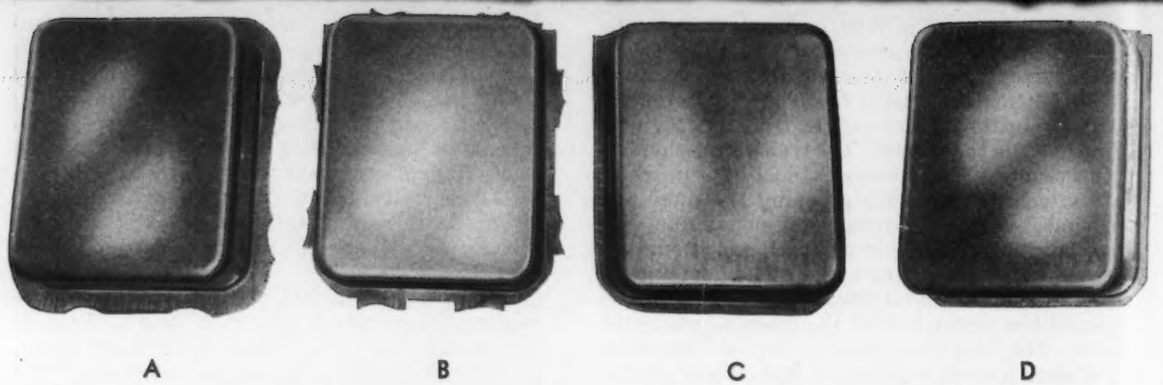


RIGHT

FIG. 2—The eight die stations, six of which are operating, are shown here. The parts move automatically from right to left through the press. One operator controls the entire press operation.



A B C D

FIG. 3—The sequence of press operations on the drawer is shown here. The 6-in. deep draw, shown as A, is made in one operation through the first station.

10 in. Ten compressed air tanks are located in the pit below the press. The press is equipped with automatic pneumatic knockouts should the parts stick to the punch at any station. The knockout arms are located directly over the particular stations which they guard.

A 75 hp motor runs the main drive of the press. All feeds are driven by electric motors designed for this application.

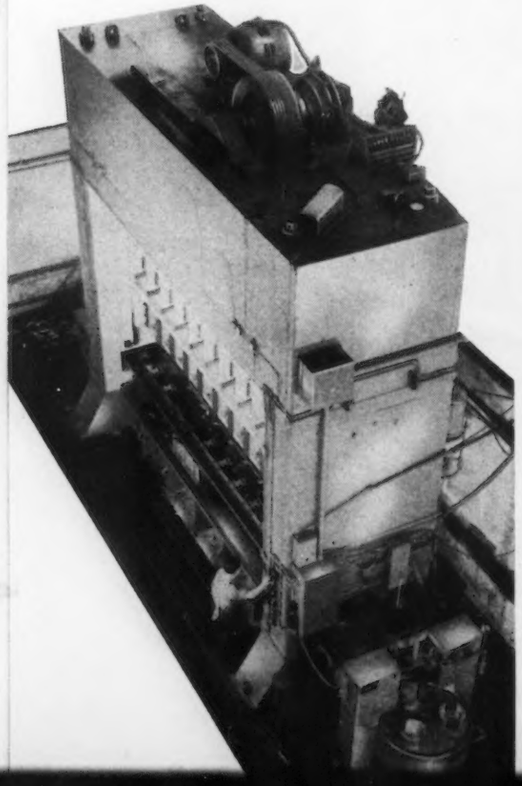
In operation, it is not necessary for the transfer feed fingers to place the parts precisely in position over the dies. All the punch dies located on the ram have centering guides built inside the punches that automatically center the part as the dies close.

A closeup view of the feed table of the range drawer press is shown in fig. 2. This press has eight stations, but for forming the drawers only six stations are equipped with dies. The sequence of operation in fig. 2 proceeds from right to left. Transfer feed fingers are shown engaging the parts and the whole slide is about to simultaneously move all parts to the next station to the left. The sheet can be seen at the extreme right about to feed into the drawing die, the bottom of which is visible. The sequence of forming on the range drawers are shown in fig. 3.

As the stock enters the press, two guns mounted on the housings spray lubricating oil on the steel. No subsequent lubricant is applied to the part. In the first die position the part is drawn and blanked from the continuous coil of steel, fig. 3A. This draw is 6 in. deep and is made in one operation. Such draws are usually a two operation procedure, but through the use of the pneumatic die cushion in the lower die set, Verson, who also made the dies for these presses, arranged to have the draw for a single operation.

The radius of the drawer bottom is 7/8 in. and the corner radii is 2 in. The dimensions of this part are 15¼x18-1/16x6 in. deep. Thus far, 125,000 drawers have been drawn without redressing the drawing die.

Scrap from this first operation, generated in blanking, is automatically conveyed away from the press on either side of the feed table. The



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LEFT

FIG. 4 — Three presses like this are used to produce 6 and 8 in. trim rings and drip pans. Drip pans are made from 3S-O aluminum and the rings are made of stainless steel. Eight of the ten stations are working stations.

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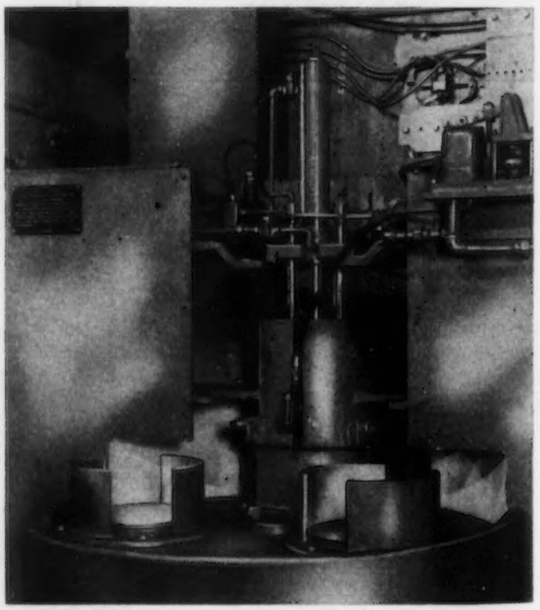
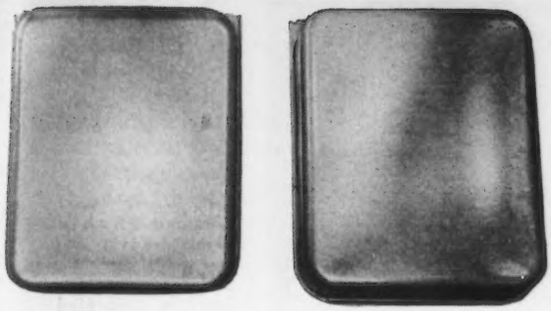
BELOW

FIG. 5—Disks to be fed through the ring and pan press are stacked in these holders and automatically fed into the press. As a stack is depleted, the barrel indexes to the next full stack.





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perati through the use of a pneumatic die cushion in the lower die set at

second and third operation working stations partially trim the corner and then finishes this trim, as shown in fig. 3*B* and 3*C*.

Scrap from these operations falls down chutes into the pit below the press. The chute feeds the scrap into hoppers that are removed when full.

The fourth die forms a flange and starts to curl the lip of the drawer, and the next die further curls the part, as shown in figs. 3*D* and 3*E*. The last forming operation, in which the dies finish curl the edge, is shown in fig. 3*F*. The finished drawer, shown as fig. 3*F*, is automatically conveyed through the delivery side of the press where it is inspected and loaded on a trolley conveyor with mating parts for further fabrication.

Prior to the installation of this press, three separate presses and four dies were required to make the same drawer. Where now only one pressman is employed three men were formerly required. Further savings accrue through the elimination of intermittent annealing and cleaning, either pickling or blasting, necessary between drawing operations in the old method of producing these drawers. Under the old setup, production averaged 100 parts an hr. Present production is, therefore, over three times faster than before, with a relative decrease in the man-hours per part.

The first presses of this type built by Verson were designed to handle parts of cylindrical or concentric shape. Recently with new ideas in die design, many rectangular and non-concentric shapes are being handled on such transfer presses. Methods of feeding are varied depending upon which type of feed will provide greatest economy and produce the least amount of scrap.

Another Verson press installation is the automatic 10 station transfer feed press for producing 6 and 8 in. trim rings and drip pans for electric ranges, shown in fig. 4. Three such presses, weighing 120 tons each and capable of developing a maximum thrust of 250 net tons, are in use. Dies are interchangeable so that either rings or pans can be made on any of the presses. It takes about 72 man-hr to change the die setup from one part to the other. Drip pans are made from 3S-0 aluminum, 0.032 in. thick, purchased as 7½ and 9⅞ in. disks. The reflector rings are made from 430 modified stainless steel, 0.035 in. thick, also bought in circle form, 8 1/16 and 10¼ in. diam.

In the manufacture of the 8 in. trim ring, eight of the ten stations are work stations. Fig. 5 shows the loading mechanism. Stainless disks are stacked in the holders and automatically feed into the press. When one stack is depleted the barrel automatically indexes to the next full stack. One stack of disks will feed the press for more than an hour, and there are three stacks.

An air blast separates the disks on each full cycle of the press. This permits the top disk to be picked up by a vacuum cup. The cup lifts the blank to the transfer feed level into the proper position to be gripped by the feed fingers, as shown in fig. 6. The operating principles of this press, the transfer feed slide, and the die stations are the same as those described in the drawer press.

A safety feature provided to guard against double blanks feeding into the first die station can be seen in fig. 7. The arm resting on top of

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FIG. 6 — An air blast separates the disks on each cycle of the press, and one disk is picked off the top of the stack by a vacuum cup and lifted to the feed level of the press.

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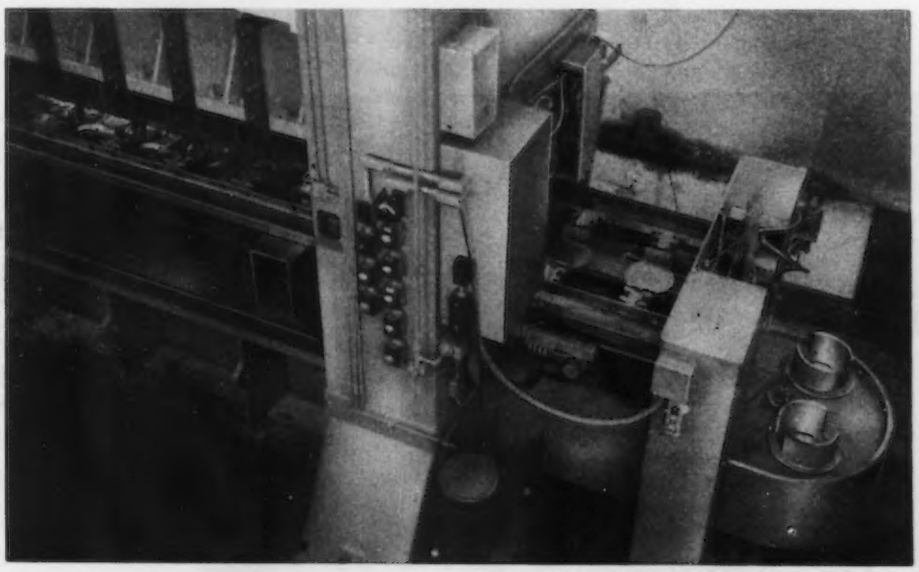

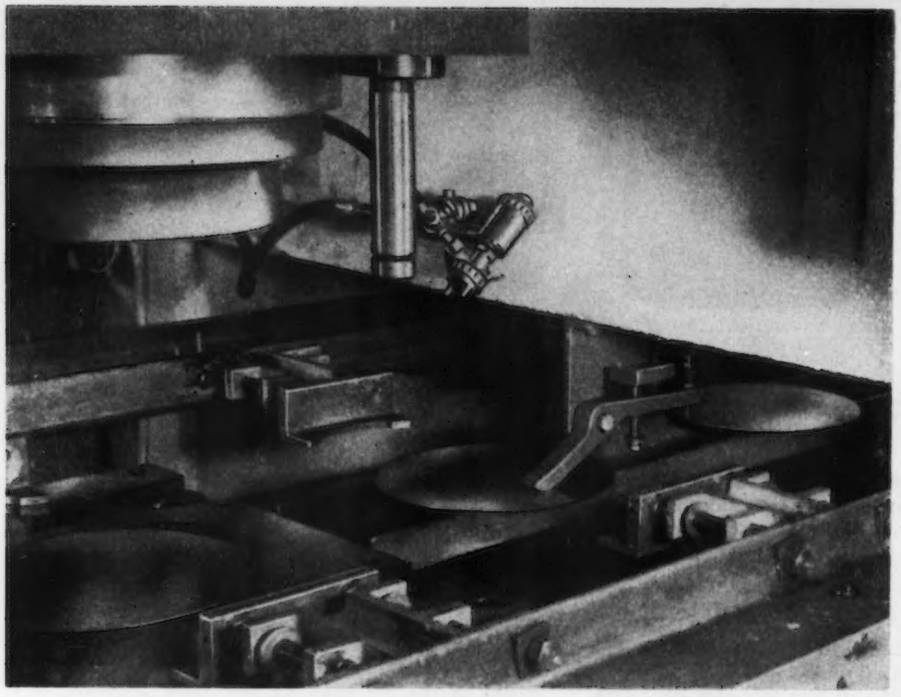

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FIG. 7—To insure against double blanks feeding into the first die, the arm resting on the blank is calibrated so that more than one blank breaks an electrical circuit, and stops the press. The spray automatically sprays the disk with drawing compound, being controlled in the press cycle.

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RIGHT

FIG. 8—This first station draws the disk and the second station, at left, blanks out the bottom. The ram of the die lifts the blanked ring and ejects it. Part of the ejector can be seen under the ram at left.

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LEFT

FIG. 9—The third, fourth and fifth stations of the trim ring press are shown here. The part feeding mechanism, along the edges of the feed table, are also shown. They advance the part one station and return to their original position.

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the disk in the center of the photograph is so calibrated that if more than one reaches that position an electrical circuit breaks, stopping the press. This position is immediately in front of the operator's station so that he simply removes the extra disk and pushes the master switch that restarts the press.

The first die station is shown in the center in fig. 8, with a blank in position. The reciprocating spray for drawing compound can be seen to the right of the top of the die. The spray works automatically with the press cycle. A shallow drawing operation is done at the first station and the center or bottom of the pan is blanked out by the second die. The transfer fingers move forward to grip the parts and slide them to the next station. The material blanked out of the part at the second station is removed with the press cycle. When blanked, the inside circle is jammed into the inverted die set by a punch located at the bottom. Thus, the female part of the die automatically lifts the blank as the slide goes up. An automatic unloader then conveys the blank away from the press. At the top of the stroke, a pneumatic ejector picks the blank out of the female die to the shovel unloader. Part of this blank removal mechanism can be seen in the extreme upper left-hand corner of fig. 8. This blank, cut from the center of the 8 in. disk, is later used to produce the smaller size 6 in. reflector ring.

The third, fourth and fifth die stations are shown in fig. 9. At the third station, extreme right, a wiping operation is performed on the inside of the ring. The fourth station trims the outside edge and starts to form the lip. At the fifth station, the dies deburr the piece and finish form the raised flange. The sixth and eighth stations, are idle, no work being done at these positions because of the size of the cam die at the seventh station. At the seventh station, the cam die pierces six slots in the vertical flange of the ring.

The cam piercing die, shown in figs. 10 and 11, is a complex special die built for this particular operation in the automatic press. Before describing the actual operation of the seventh station die used in producing 8 in. trim rings, some of the general construction and special features required of dies to operate in this special automatic equipment might be summarized. It would be impossible to list these in a sequence of importance as they all take an equal part in the performance of the equipment.

The overall design and construction of the complete die must be stressed to withstand rhythm of the impact present in any automatic pressing equipment of sufficient tonnage to coin or draw. All primary motion within the die must be controlled by positive double-action mechanical cams, hydro-pneumatic or pneumatic cylinders. This safety feature is followed to guard against spring fatigue and excessive maintenance.

During part of the operating cycle of the press the die table or feed level height, *A*, must present a flat surface to allow the transferring mechanism to move the workpiece from station to station. The primary location of the part on the surface is performed by the feeding mechanism and the final location takes place as the ram descends to work the piece. One of the big differences of these high production automatic dies is that the piece is usually pressed into the lower or upper die before being worked and then returned to the feed level for transferring.

In explaining how this seventh station operates, a complete press cycle will be described. On the up-stroke of the press ram, as the upper die clears the workpiece, the feed bar and fingers close and contact the next one, transferring it to the seventh station in primary location over the center of the die. During this transfer the press ram completes its up-stroke and starts down. The feeding mechanism opens and during the pressing cycle returns to the pickup position, ready to close and contact the next part. The feed mechanism operates during the ram cycle and is synchronized, thus allowing the press cycle to be continuous.

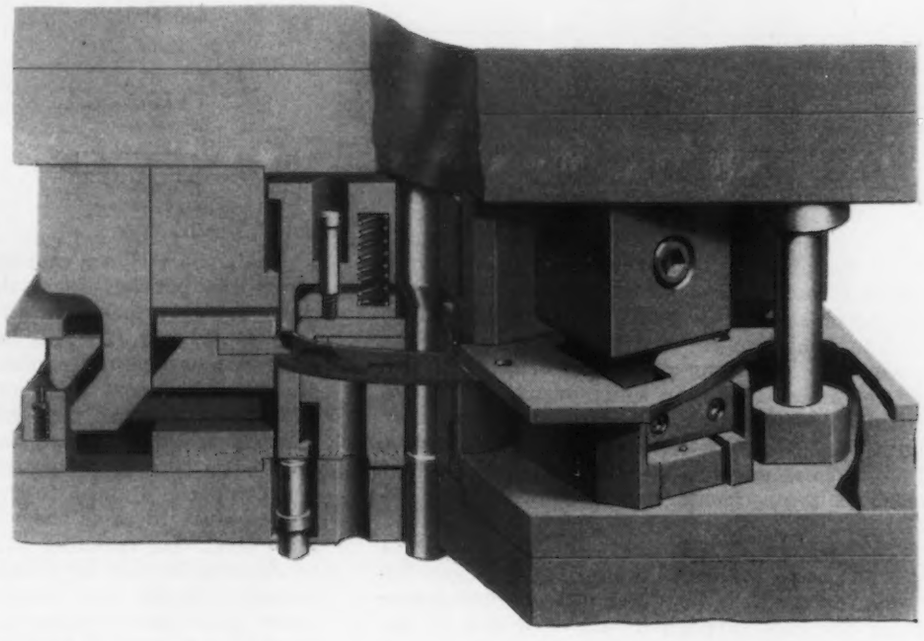


FIG. 10 — Shown here is the seventh station die in a closed position with a workpiece being punched. The workpiece is in phantom view and the various die components are shown in their respective places during the punching phase of the press stroke.

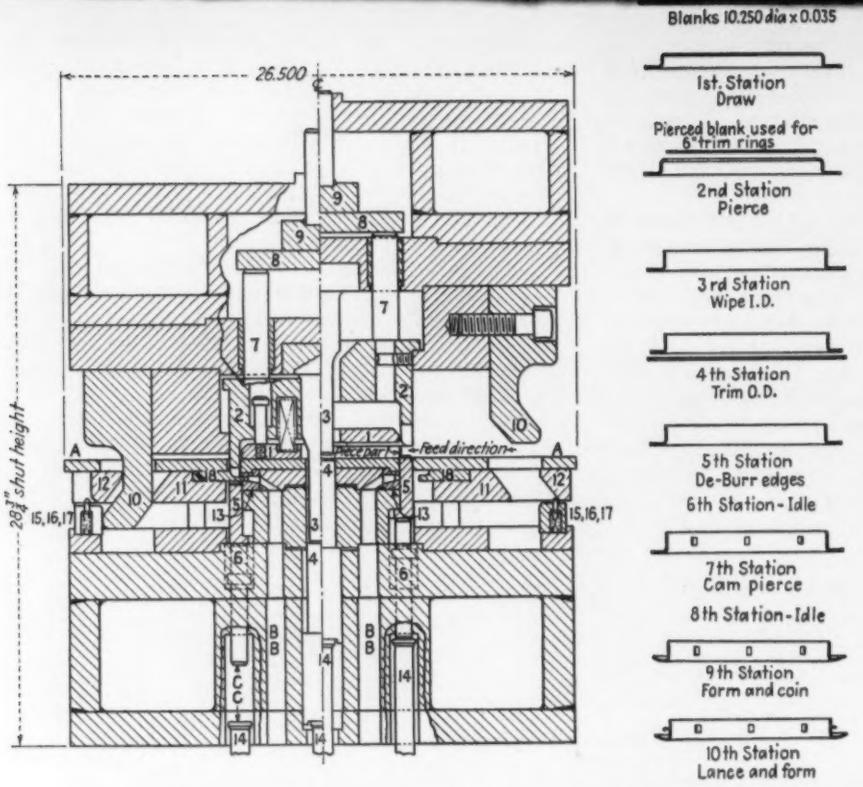


FIG. 11 — Details of the seventh station die are shown here with the die in both an open and closed position. Also shown are the individual operations at the various stations of this trim ring forming press.

On the pressing cycle when the ram descends, *detail 1* contacts and holds the part under light spring pressure until *detail 2* contacts and brings it into final location and depresses it into the lower die. A timing pin, *detail 3*, contacts and depresses *detail 4*, a pin which overcomes the bed cushion pressure causing *details 5* and *6* to recede until they come to a predetermined positive stop, thereby locating the work over the male die that contains the sectional female piercing dies, *detail 13*.

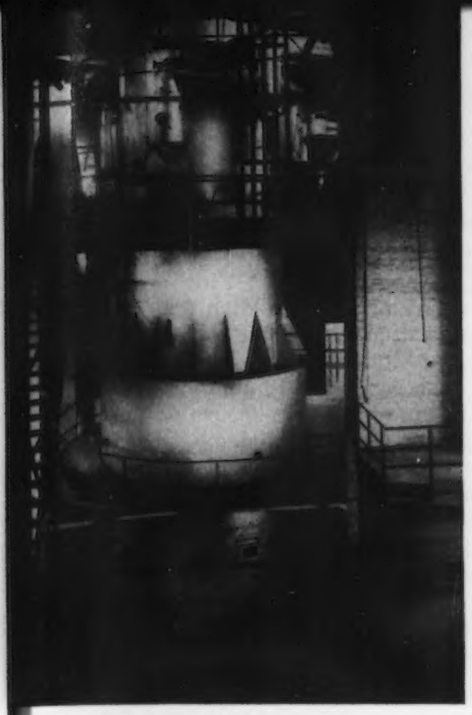
The descent of the workpiece is stopped in location over the male locator and confined between *details 2* and *5*. *Detail 2* maintains constant pressure through *details 7*, *8* and *9*. On further descent of the ram, *detail 2*, is depressed into the upper die, allowing the upper cams, *detail 10*, to contact the double-action slide cams, *details 11* and *12*. These contain and actuate the piercing punches, *detail 18*. The six punches and slides move radially toward the center of the die and pierce the six 0.078x0.224 in. rectangular slots.

The slugs are pressed into the female dies and into the slug openings within the die. They travel down through the lower die, *BB*, through the bolster and the top of the cushion, which is controlled to pass them out the rear of the press into containers at floor level. Because of the small size of these slugs no mechanical equipment was needed for disposal from this point.

At this time the press ram has reached bottom of the stroke and starts the upstroke. On the upstroke the ram and bed cushions, which maintain pressure throughout the entire cycle, start an opposite motion. The timing pins, *details 3*, *4* and *14*, do not allow the cushion pressure to permit *details 5* and *6* to travel, *CC*, until the piercing punches have receded and cleared the flange of the work. *Detail 10* contacts *detail 12*, which is the stripper cam on the cam slide, and strips the punches from the work. The cam slides are then locked in an *out position* by *details 15*, *16* and *17*. This locking mechanism is a safety measure to keep the cam slides open and ready for the next press cycle. After the cam slides have reached this extreme *out position*, clearing the work flange and *detail 5*, the ram ascent has allowed the pressure pin, *detail 14* to permit *details 6* and *5* to travel the *CC* distance and to start to raise the workpiece to the feed table level. On reaching this level, the piece is retained in location by *detail 2*. As *detail 2* loses contact with the part flange, *detail 1*, which is under light spring pressure, holds the piece in location and strips it from the locating ring, *detail 2*, freeing it. The feed bars and fingers close and transfer it to the next position in primary location ready for the next press cycle.

The ninth station performs the final forming operation and coins the lip contour. At the tenth station, another cam die pierces and forms two retaining prongs on the flange of the ring. The rings are conveyed off the delivery side of the press, going directly into buffing machines prior to subsequent cleaning and chrome plating. These finishing operations are also automatic production lines.

Aluminum drip pans, stamped in the same presses used for making rings, are made in seven die stations. In former methods used by Hotpoint to make the rings, five presses and five men were employed. Under this old setup, 350 rings an hr was average production. The Verson automatic transfer presses produce 550 an hr and only one press operator is required. Drip pan production by the old method employed six presses and six operators, making 350 pieces per hr. The Verson presses produce 550 pieces an hr using but one operator.



Commercial Production Of Sponge Iron

THE Wiberg-Soderfors sponge iron furnace. At the left is the furnace shaft at Soderfors, and at right is illustrated the Charcoal carburetor.

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Production of sponge iron and its use in steelmaking as a substitute for scrap is shown by the author to be commercially feasible, particularly in the making of quality steels, both in Canada and in the United States. Test runs conducted in Sweden, employing the Wiberg-Soderfors process have indicated the excellent performance of Canadian Steep Rock ore and the high production rates possible. Comprehensive operating and cost data, converted to southern Ontario conditions, are presented in this article, as is information relating to sponge iron end use.

EVEN the discussion of the use of sponge iron as a substitute for scrap in the production of steel is looked on with extreme disfavor by many engineers in the United States. This is perhaps natural, considering the history of the many expensive attempts to develop a practical process for making sponge iron in the United States.

A recent article gives an excellent resume of the reasons why sponge iron cannot be considered as a large scale commercial substitute for scrap at the present time in the United States.[1]

An extensive study of possible methods for commercial production of sponge iron in Canada has been carried out by the Ontario Research Foundation, on behalf of the Ferrous Metallurgy Committee of the Ontario Research Council. Early in this work it became apparent that there are two kinds of sponge iron processes.

(1) The first has been commercially proven and has been in production at least 5 years. Accurate cost data are available and intelligent estimates of production costs in various locations can be made.

(2) The other type of process is still in the pilot or experimental stage. The chance of successful commercial operation is largely a matter of opinion. Most of the experience of American metallurgists has been with this type of sponge iron process. Beyond examining and cataloging over 150 of these proposed sponge iron processes, no further attention was paid to them since none showed sufficient promise to justify spending money on further development at the expense of erecting and operating a

commercial plant for one of the commercially proven processes.

As a result of the study it appears that on a straight cost basis there is absolutely no possibility at present of substituting sponge iron for scrap in making ordinary grades of steel, except in very unusual circumstances, and there is certainly no possibility of developing a large scale market for sponge iron for this purpose in North America at present. At any given location, sponge iron will always cost more to produce than pig iron unless a very cheap reducing agent such as natural gas or electric power is available. Locations where such conditions exist are rare. One of the few other situations where the consideration of sponge iron processes is practical is where a company cannot afford the large investment necessary to produce pig iron or bessemer metal, or cannot consume all the products of these larger-scale processes.

The possibilities for making a profit from production of sponge iron are not as dim as these statements might indicate. The fact that sponge iron processes do operate in several locations in the world and make a profit, proves that the commercial production of sponge iron is feasible under certain specific economic conditions. One objective of the investigation reported herein was to define these conditions and to decide whether they exist anywhere in Canada or in fact anywhere in the world except in Sweden.

Speaking generally it appears that where the costs of raw materials are within limits to be set forth later, where the amount of sponge iron needed is less than 100,000 tons per year, or where the sponge iron is to be used in the manufacture of expensive or high quality steel, it is worthwhile studying the possibilities of producing and utilizing sponge iron for melting stock.

Having reached this conclusion, some work was undertaken to determine the special advantages of each of the three processes regarded as having commercial possibilities in North America.

In addition to studying the possibility of producing sponge iron at a price which would allow its substitution for scrap, it was also of interest to determine whether it is feasible to consider using a sponge iron process as the basis of a very small scale steel industry at points remote from the present centers of steel production in Canada. For this application, the amount and type of reducing agent used in the processes appears the most important factor in classifying commercial sponge iron processes.

The processes studied were as follows:

The Krupp-Renn process, which is carried out in a rotary kiln. Fine ore is fed into the kiln along with a solid reducing agent. The temperature of the charge is raised until partial fusion is obtained. The product is discharged in a semi-fluid state and the slag or gangue is separated from the melt by crushing and magnetic concentration.

This process is in use in many countries of the world.[2] The only reason for using it is that some very high silica ores can be treated by this method which cannot be treated at a comparable cost in any other way. The process is of no interest in Canada, since no such commercial ores exist in this country.

The Brick Kiln process, which is carried out in standard brick-making kilns. Fine ore is packed in containers or saggers with fine coal or coke and heated to about 2000°F. The most satisfactory type of kiln appears to be a modern tunnel kiln. Labor costs for this process are relatively high.[3] The process is in use at only one place—Hoganas Co. in Sweden.[4] It can only be considered seriously for commercial production of melting stock where a brick kiln is already in existence, the ore to be treated must be ground very fine during concentration, and cheap coke breeze or similar material is available. It is only regarded as a possible emergency method of supplementing the scrap supply in Canada using existing brick kilns.

The Wiberg-Soderfors process, which is carried out using lump ore, sinter or pelletized ore in a shaft furnace. The only operating unit of this type is now in use at Soderfors, Sweden. Efficiency of the process is excellent and the method seems most suitable of all those studied for providing high-grade melting stock for quality steel or the basis of a very small steel industry.[5]

The Wiberg furnace at Soderfors has been in continuous operation since 1941. Prior to that year, operation was spasmodic and many changes in design and operation were made.[6] Present operation is satisfactory and production is about 27 net tons of sponge iron per day.[7] Most of the feed used is sintered Vintjarns ore, and the average reduction degree (Pct metallic Fe: pct total Fe) is about 85 pct. Many trials have been made to determine the suitability of various ores for feed to the furnace, both in their sintered and natural lump form.[8]

Fig. 1 shows details of the Wiberg-Soderfors furnace operation. The excellent efficiency of the process is mainly due to the method of recycling the larger proportion of the spent reducing gas and regenerating it by passing through a bed of hot coke, so that consumption of solid reducer approaches the theoretical minimum for reduction of iron oxide. In effect, the conversion of carbon dioxide to carbon monoxide, which also occurs in the blast furnace, is carried on in a separate container under controlled conditions and at a controlled rate. Necessary heat for the reaction is provided by electric power.

An important difference from most other gaseous direct reduction processes is that the ratio of carbon monoxide to hydrogen in the reducing gas was deliberately chosen from fundamental thermodynamic considerations so that the minimum of external heating was needed and the process still gave a reasonable production rate.

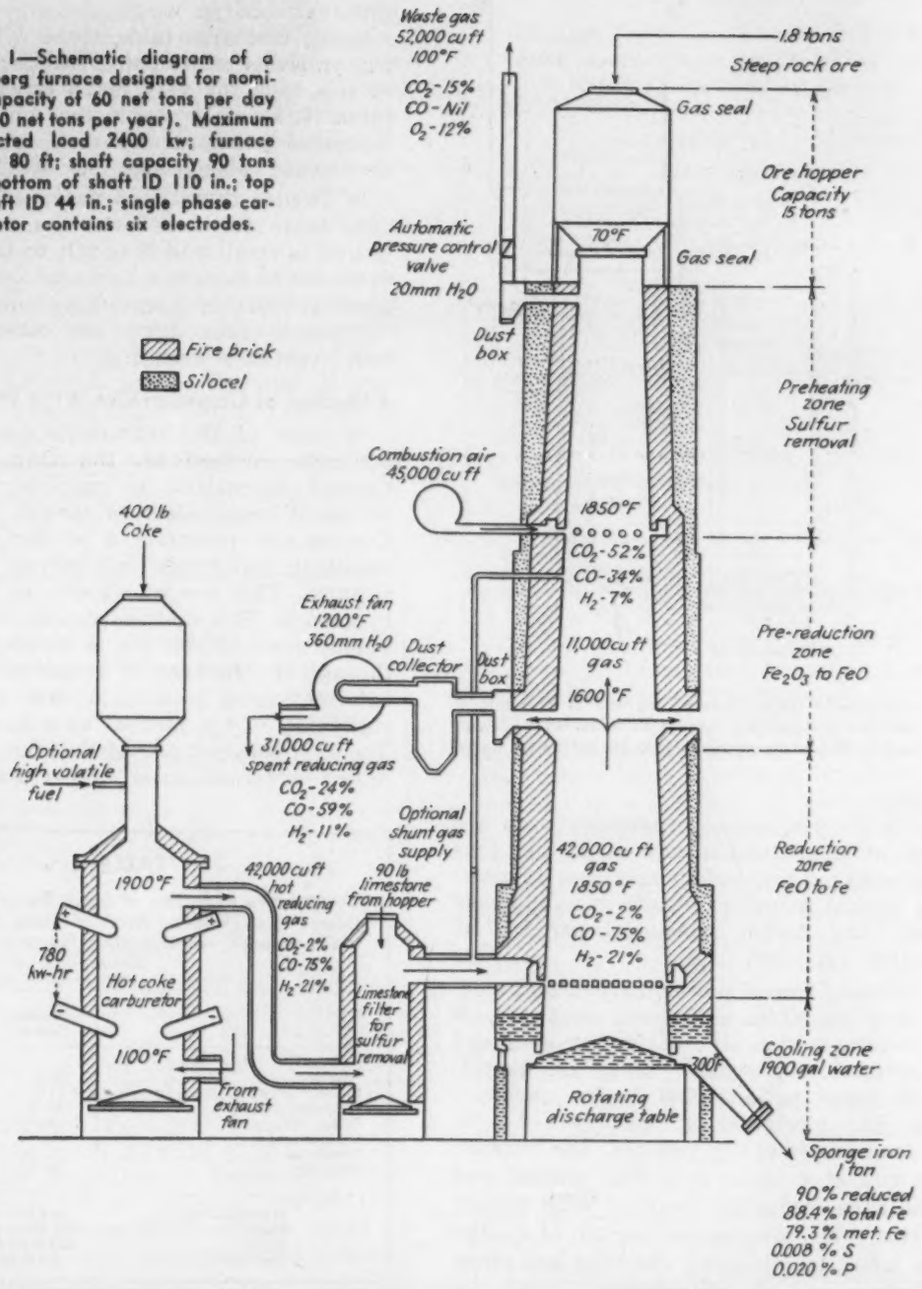

FIG. 1—Schematic diagram of a Wiberg furnace designed for nominal capacity of 60 net tons per day (22,000 net tons per year). Maximum connected load 2400 kw; furnace height 80 ft; shaft capacity 90 tons ore; bottom of shaft ID 110 in.; top of shaft ID 44 in.; single phase carburetor contains six electrodes.

A major requirement of a practical sponge iron process is a reliable method of temperature control in the furnace. This is not very often provided in proposed sponge iron processes, with the result that a temperature range may be reached where sticking of the ore begins.

A very efficient method of controlling temperature in the Wiberg shaft is by changing the carbureter operation slightly. If the temperature in the reduction zone of the Wiberg shaft starts to rise, a small amount of a fuel, which will produce hydrogen in the carbureter, is added to the carbureter feed. Suitable fuels include oil and other liquid or gaseous hydrocarbons. Any cheap hydrocarbon fuel which does not contain too much sulfur should be suitable for this purpose. The reduction of iron oxide by hydrogen is strongly endothermic; therefore a slight increase in hydrogen content of the reducing gas will cause the temperature in the reduction zone to fall. At the same time, the speed of the reduction reaction will be increased slightly so that production can be maintained at the same level. This is a theoretically perfect method for temperature control in this process.

A recent paper gives operating details of this plant which have never been published before.[9] From the author's observation of the operation of this furnace it appears that it is well beyond the pilot operation stage and is a reliable and easily operated unit.

Maximum economical production rate of the Wiberg furnace depends on the character of the feed ore. With the normal sintered feed

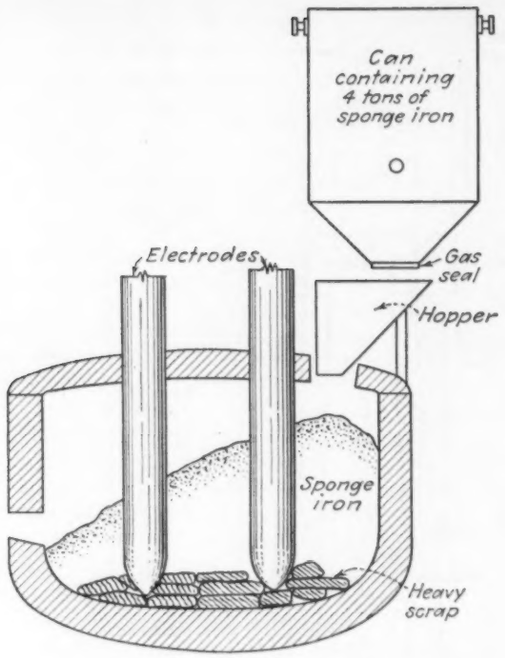

FIG. 2—Schematic sketch showing method of charging a 10-ton electric steelmaking furnace at Soderfors. Charge is composed of 70 pct sponge iron and 30 pct home scrap.

used at Soderfors, lowest production costs are obtained at a production rate of 27 net tons per day of 85 pct reduced sponge iron. Increasing the percent reduction results in an increase in power and carbon consumed per ton of sponge iron produced.

The consumption of power, carbon and electrodes per ton of metallic iron produced, is nearly constant with all satisfactory ores and types of feed, and typical values are as follows; electrical power—1000 kw-hr, carbon—550 lb, and electrodes (Soderberg)—9.4 lb. If the feed ore is easily reduced, the furnace may be run at a faster rate than normal and give the same reduction degree. With higher production rates, the charges per ton of sponge iron for labor, maintenance, overhead and other fixed charges will be reduced.

The present furnace at Soderfors is rated at 10,000 tons a year production. New furnaces being built are rated at 20,000 tons a year. Since all charge weight is supported on the rotating discharge table, there will be mechanical problems in designing satisfactory furnaces of this type for very much larger production rates. It seems probable that operation under increased pressure and with easily reducible ores would raise production rates considerably.

In Sweden there is no necessity for building very large furnaces since the production required is small and it is felt to be much more desirable to have two furnaces operating for a given production than to have only one. If one furnace is shut down, the other, of course, could continue operating.

TABLE I

Analyses of Raw Materials

	Steep Rock Ore		Vintjarns Sinter
	Dry Basis	Calcined at 800°F	
Iron, pct	61.2	67.0	62.6
Phos., pct	0.025	0.027	0.020
Sulfur, pct	0.042	0.024	0.010
Silica, pct	3.2	3.5	10.5
Alumina, pct	0.6	0.66	.....
Lime, pct	0.1	0.11	.....
Magnesia, pct	0.4	0.44	.....
Manganese, pct	0.2	0.22	.....
Water of Cryst., pct	8.8	0.0	.....

Reduction of Canadian Ore in the Wiberg Furnace

In view of the reasonable production cost estimates arrived at, the Ontario Research Council authorized a complete investigation of the Wiberg-Soderfors sponge iron process. Canada now possesses a producing source of excellent high-grade iron ore at Steep Rock, Ontario. This ore was known to be very easy to reduce. The obvious course to follow was to ship some of this ore to Sweden and pass it through the furnace at Soderfors to get exact information on production data, costs and the suitability of the product as a scrap substitute. The data obtained proved that this ore gives excellent performance and higher production rates than most other ores which have been tried in the Wiberg furnace.

TABLE II

Comparative Reduction of Steep Rock Ore and Vintjarns Sinter. Three-ton Batch of Steep Rock Ore Fed While Furnace was Operating Normally on Vintjarns Sinter

	Vintjarns Sponge	Steep Rock Sponge
Total iron, pct	81.5	93.5
Metallic iron, pct	71.2	89.2
Reduction, pct	87.2	95.4
Sulfur, pct	0.005	0.008
Phosphorus, pct	0.018	0.020
Carbon, pct	0.70	0.65
Silica, pct	10.0	4.5

Production rate	23.2 tons per day
Power	760 kw-hr per ton
Carbon	384 lb per ton
Electrodes	6.6 lb per ton

Steep Rock ore contains about 8 pct combined water of crystallization (see table I). This water is driven off in the preheating zone of the Wiberg furnace, leaving the ore in a porous condition ideal for gaseous reduction. Because of the porous nature of preheated Steep Rock ore, reduction is very rapid. One batch of 3 tons of Steep Rock ore was run through the Wiberg furnace while it was operating on its normal feed of good grade sintered Vintjarns ore (table I). The Steep Rock ore was 94 pct reduced, whereas the sinter was about 88 pct reduced under identical conditions (table II).

During the test run on lump Steep Rock ore, the furnace production rate was increased

steadily from 22 to 29 tons a day; the degree of reduction was over 95 pct at the slower rate and about 94 pct at the higher rate. The possibility of increasing production further and at the same time obtaining a high grade sponge iron, was proved by these tests. Some data from the trial runs are shown in table III.

Great interest has been shown recently in the possibilities of modifying the Wiberg-Soderfors process by substituting a suitable natural gas for most of the hot fuel in the carbureter. The commercial proof of this simple change in technique would allow the intelligent consideration of the possibility of using this process as the basis of a very small-scale steel industry in countries having deposits of good iron ore and natural gas or oil, but no coal or charcoal.

Sulfur elimination in the Wiberg furnace was excellent using Steep Rock ore. The average sulfur content of the sponge iron is 0.008 pct; sulfur in the ore was 0.043 pct. The sulfur elimination was therefore over 80 pct.

TABLE III

Steep Rock Sponge Iron Produced in Wiberg Furnace

	Production Run at Soderfors	Calculated Performance at 90 pct Reduction
Production, tons per day	28.4	34.9
Power, kw-hr per ton	840	780
Carbon, lb per ton	430	400
Electrodes, lb per ton	6.2	5.7
Reduction, pct	94.9	90.0
Total iron, pct	90.7	88.4
Metallic iron, pct	86.1	79.3
Carbon, pct	0.75	0.50
Sulfur, pct	0.008	0.010
Approximate production cost in Canada per net ton of total iron contained in the Sponge Iron (10 year write-off)	$34.90	$32.90

Results of these trials proved that a 10 pct increase in the rated capacity of the Soderfors furnace, when operating on Steep Rock lump ore to produce 90 pct reduced sponge iron, would be a very conservative estimate. A 30 pct increase in production rate was easily obtained while still producing sponge iron over 93 pct reduced.

Many proposed sponge iron processes aim for the lowest possible carbon content. It is not generally realized in North America that a carbon content of 0.50 pct or more in sponge iron makes for much easier and more rapid melting of the material in steelmaking furnaces.

Wiberg-type sponge iron, with a carbon content of over 0.65 pct, made from Steep Rock ore, is a satisfactory scrap substitute in Canadian steel practice when 90 pct reduced.

Canadian Production Costs

The production costs shown in table V are based on average material costs for southern Ontario. The Wiberg furnace is assumed to be operating in conjuction with a small steel plant where laboratory facilities, maintenance, personnel and supervisory staff are available.

TABLE IV

Construction Cost in Canada for One Wiberg Furnace With Two Carbureters and Two Exhaust Fans. Rated Capacity 22,000 net tons/year

Item and Quantity	1947 Costs in Hamilton, Ont., $
Raw Materials & Machinery	
Refractories—174,200 bricks @ $145/1000	26,000
Insulation—88,000 lb @ 6¢/lb	5,300
Heat resistant plate—14,300 lb @ 70¢/lb	10,000
Fabricated beams—5,500 lb @ 15¢/lb	850
Fabricated plate—165,000 lb @ 15¢/lb	24,800
Cast steel—100,000 lb @ 25¢/lb	25,000
Alloy cast steel—1,100 lb @ 90¢/lb	1,000
Cast iron—17,600 lb @ 25¢/lb	4,400
Copper bus bars—20,000 lb @ 40¢/lb	8,000
Various mechancial equipment	45,000
Handling equipment + 10 ton crane	45,000
Furnace transformers—3 @ 800 kw	40,800
Controls	5,000
Erection of brickwork—174,200 bricks @ $70/1000	12,500
Erection of insulation	700
Erection of mechanical equipment	30,000
Erection of electrical work	2,500
Building, erected	75,000
	$361,850
Miscellaneous and contingencies	88,150
	$450,000*

* This estimate is only for the furnace and its auxiliary equipment No provision is made for tracks, sewers, crushers, ore handling equipment, cranes, working capital, etc.

Use of selected lump Steep Rock ore, for which a premium must be paid, is assumed. Using other ores or fine Steep Rock ore, there would be additional costs for screening out and sintering or pelletizing fines below ¾ in. Many other other ores are quite satisfactory for this process, but exact data on their performance in the Wiberg furnace must be obtained before similar cost analyses can be made.

The plant, (including furnace, control room, building to house the furnace, and handling equipment to and from the furnace) costs about $600,000 in Canada. Canadian construction costs are slightly lower than U. S. construction costs. Amortization is not included in production costs. Labor includes foreman, furnace operators (2 each shift) and laborers.

Maintenance figures are taken from the records at Soderfors. Overhead includes office

(CONTINUED ON PAGE 82)

TABLE V

Estimated Sponge Iron Production Costs per Net Ton Using Average Material Costs for Southern Ontario in 1948 and Based on Two Wiberg-Soderfors Furnaces Each Producing 64 Net Tons per Day of 90 Pct Reduced Sponge Iron

Ore—1.6 gross tons selected steep rock lump—52 pct Fe @ $10.50/ton		$16.80
Coke—425 lb @ $13.50/net ton		2.85
Limestone—100 lb @ $1.85/net ton		0.09
Power:		
For carburetor—780 kw-hr @ 0.3¢/kw-hr		2.34
Motive—90 kw-hr @ 0.55¢/kw-hr		0.50
Electrodes—8.3 lb @ 6¢/lb		0.37
Cooling water—2000 gal @ 0.003¢/gal		0.06
Sundry materials and lubrication		0.25
Labor—1.3 man-hr @ $1.25 (20 men, not including transport)		1.63
Salaries		0.50
Repairs and maintenance:		
Materials	0.50	
Labor	1.00	
		1.50
Geberal overhead		2.20
Production cost		$29.09

Interest and amortization charges and profit must also be provided for a total expenditure of about 3 million dollars for a production rate of 45,000 tons per year.

Machining

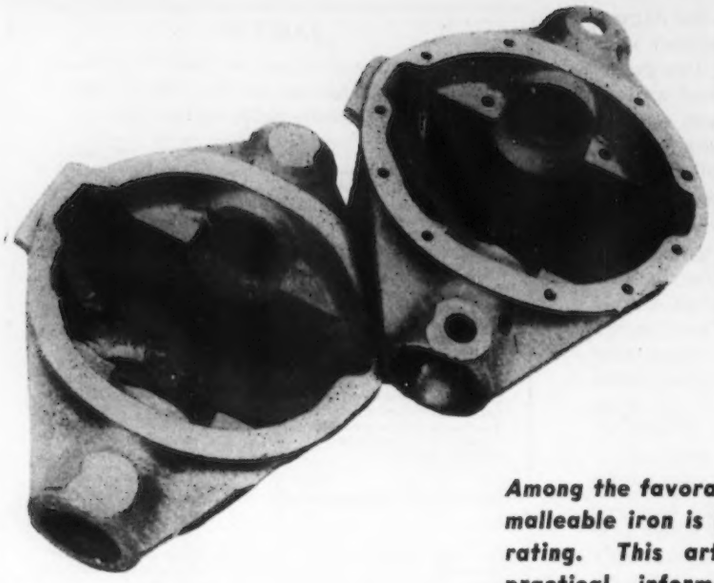

FIG. 1—The rough casting "left" and the finished machined part "right," an automotive differential carrier are shown here. The outside face diameter is milled at 215 sfpm without the use of a coolant.

Among the favorable characteristics of malleable iron is its high machinability rating. This article gives extensive practical information on machining rates and techniques by taking a number of typical castings and describing the feeds, speeds, tool material, coolant and output.

MALLEABLE iron castings are being effectively employed in various automotive applications as well as in other industrial equipment because they can be cast close to the final required form, they are tough enough to withstand the impacts encountered by moving vehicles and equipment, and can be easily, rapidly and economically machined. The machining procedures are determined by the inherent characteristics of the material, and many industries are taking advantage of the properties of malleable iron to finish parts rapidly and economically to close tolerances.

Field and Stansbury† reported that in comparing three cast irons, "the malleable iron had such a long tool life that sufficient material was not available to obtain 0.030 in. of tool wear at cutting speeds below 510 sfpm. In fact, 1575 cu in. were removed at 290 sfpm to produce a tool wear of only 0.005 in." The machinability rating of malleable iron is high. Based upon cold rolled or cold drawn bessemer screw stock as having a machinability rating of 100 pct, a rating of 120 pct has been established for standard malleable

† *Transactions, ASME, Vol. 69, No. 6.*

FIG. 2—A companion part to the differential carrier is this casting. The rough casting at "left" is finished as shown at "right" on a Bullard Mult-au-matic at a cutting speed of 241 sfpm and production totals 127 parts an hour.

Malleable Iron

FIG. 3—This wheel hub weighs 7½ lb and is 6⅞ in. in diameter. The flange is faced and the hub is turned, rough bored, rough and finish reamed and threaded on a turret lathe. The flange is faced at a cutting speed of 460 sfpm.

By MILTON TILLEY*, W. M. ALBRECHT*, L. R. SPANN* and J. H. LANSING*

and a rating of 80 to 90 pct has been established for pearlitic malleable iron.

By comparing the rate of tool wear, using carbide tools, with the volume of metal removed, Field and Stansbury were able to evaluate tool life for any tool wear. The relative order of tool life for the various materials machined was the same at a uniform rate of tool wear of 0.0150 in. as at 0.030 in. In these tests, the fact was also confirmed that ferrite-graphite structures, such as in malleable iron, require less power for a given rate of metal removal than do pearlite-graphite structures.

* *Malleable Founders' Society, technical council subcommittee, consisting of Milton Tilley, metallurgist, National Malleable & Steel Castings Co., Cleveland; W. M. Albrecht, assistant to the chief engineer, Chain Belt Co., Milwaukee; L. R. Spann, assistant superintendent, Eastern Malleable Iron Co., Naugatuck, Conn.; and James H. Lansing, technical and research director, Malleable Founders' Society, Cleveland.*

The automotive differential carrier, shown in fig. 1, makes excellent use of the design and machining characteristics of malleable iron. In the carrier, bearing seats of substantial section are provided for firm support of the differential case that carries the ring gear. Cored cylinders are incorporated for inserting and solidly gripping the axle tubes. A third cored cylinder placed 90° to the other cylinders receives and supports the propeller shaft. No metal is wasted in the design. At the left of fig. 1 is the rough casting and at the right is the faced and drilled part.

These carriers have an outside face diameter of 9⅝ in. and are rough milled with 44A and 883 Carboloy tools. Spindle speed is 68 rpm, cutting speed is 215 sfpm, depth of cut is 0.010 to 0.012 in., and feed is 0.011 ipm. No coolant is used and production is 55 pieces per hr, with an average tool life of 16 to 24 hr per grind.

A companion part to the differential carrier is the casting shown in fig. 2, comparing the casting before and after machining. Using water as a coolant, the 7⅝ in. flanges of these castings are turned at a cutting speed of 241 sfpm on a Bullard Mult-au-matic. Carbide tools permit a feed per revolution of 0.0115 in. and a depth of cut of 0.010 to 0.015 in. Production totaled 127 pieces per hr and tool life averaged 18 to 20 hr per grind. The differential cases carry the ring gear, through which power is applied to drive automotive vehicles. Consequently, to insure quiet and efficient application of power, these parts must be machined to close tolerances and finishes must be of a high order.

Another part of an automotive drive assembly is the propeller shaft bearing retainer. The bearing retainer is a malleable casting having a 4½ in. diam flange. The flange end of these castings is turned and the spiral groove in the cored hole is milled in one operation on a Baird six-spindle, horizontal indexing lathe, and production is 132 pieces per hr.

The malleable wheel hub shown in fig. 3 weighs 7½ lb and is 6⅞ in. diam. The flange is faced, and the hub is turned, rough bored, rough and finish reamed, and threaded on a Warner and Swasey No. 2A turret lathe, driven by a 15 hp motor. The turning and facing tools are carbide and the reaming, boring and threading tools are

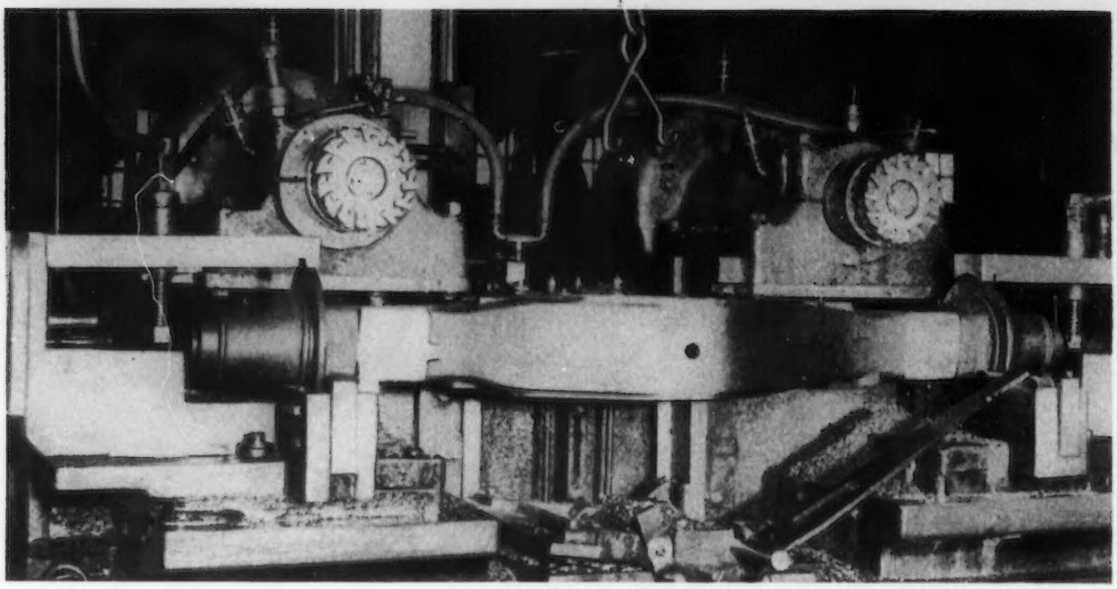

FIG. 4—Bracket pads on this motor truck axle are milled at a speed of 345 sfpm with a cutter feed rate of 35 ipm and a depth of cut of 1/4 to 3/8 in.

high speed steel. Soluble oil and water is used as a coolant.

In facing the hub, the depth of cut is 1/8 in. and in turning the hub, depth of cut is 3/16 in. Feed per revolution, at 320 rpm, is 0.011 in. on the turning and facing cross slide carriage, and 0.008 in. on the rough bore. In facing the flange, the cutting speed is 460 sfpm.

Motor truck axle manufacturers find malleable iron castings provide a tough and sturdy rear axle, yet one that may be production machined with speed and economy. The housing shown in fig. 4 is being machined on a Milwaukee vertical milling machine. The 8 in. diam 14 toothed carbide cutter, running at 165 rpm, mills the bracket pads at a speed of 345 sfpm. Feed per tooth is 0.015 in., cutter feed rate is 35 to 45 ipm, and the depth of cut is from 1/4 to 3/8 in. A soluble oil coolant is used, and tool life averages 66 castings.

Advantage is being taken of malleable casting design possibilities in the production of side frames, caster forks, yoke, lift housing and lifting arms of a heavy duty jack. The three cored holes in the lifting arm of the jack, shown in fig. 5, are 1.376 in., 1.127 in., and 0.750 in., diam, respectively. These holes are drilled on a Baker multiple-spindle drill press at 350 rpm with a feed of 4 imp. High speed drills and a soluble oil and water coolant are used.

At the same plant, the large cored opening of the housing shown in fig. 6 is face milled with a 6 in. diam, 12-toothed carbide tipped cutter at 200 rpm. Feed is 10.5 ipm, or 0.0043 in. per tooth, and depth of cut is 1/8 in. No coolant is employed.

The second operation on this casting is performed on a Warner & Swasey No. 3 turret lathe. The operation consists of drilling, reaming, facing and tapping the 1 in. diam hole. Drilling is at 564 rpm with a 0.0075 in. per revolution feed, while tapping is at 134 rpm for the 1/8 in., No. 20 thread. Drilling is with a soluble oil and water coolant at a speed of 141 sfpm.

In the manufacture of an automobile body straightening jack, a malleable iron pump housing is used. On an automatic chucking machine, using soluble oil coolant, a 2.076 in. diam hole, 1 in. deep, is bored and tapped and the bottom is faced and chamfered. The rough boring and

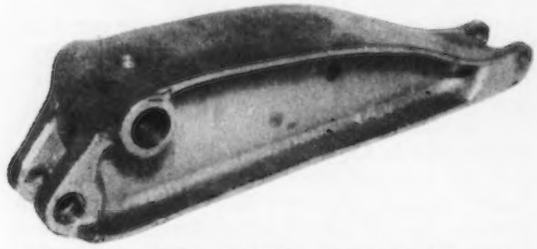

FIG. 5—The three cored holes on this heavy duty jack lift arm are drilled at 350 rpm with a feed of 4 ipm.

FIG. 6—The cored opening of this housing is face milled with a 6 in. diameter 12-toothed carbide tipped cutter at a feed of 10.5 imp and a depth of cut 1/8 in. without coolant.

FIG. 7—This malleable motor truck differential case is milled at a rate of 38 pieces an hour.

chamfering is done with a four-lipped carbide cutter. Depth of cut is 0.200 in., feed is 3½ in. per revolution and spindle speed is 311 rpm. A high speed steel tap is used at a spindle speed of 103 rpm and a feed of 3½ ipm.

The pearlitic malleable iron motor truck differential case shown in fig. 7 is machined on a Bullard Mult-au-matic at a rate of 300 pieces in 8 hr, using a soluble oil cutting fluid. The rough castings (left) are 6.527 in. diam, and the machine is equipped with carbide tools. The following shows machining data:

	Cutting Speed, Sfpm	Depth of Cut, In.	Feed, In.	Spindle Speed, Rpm
Rough Turn OD	254	3/32	0.0139	149
Semi-Finish Turn OD	219	0.020	0.0146	149
Finish Turn OD	85	0.005	0.0282	149
Chamber OD	195	1/16	0.0153	149
Bore and Ream 2.1880 In. Diam.	85	0.005	0.0282	149*

* While the spindle speed for this operation was 149 rpm, the reamer speed of 109 rpm is used to accommodate the characteristics of the type of cut on malleable iron.

The cutting speed of 254 sfpm is the fastest speed consistent with the time delay in changing tools that malleable could stand under the conditions imposed. The other cutting tool speeds are limited by this speed.

For pipe fittings, malleable iron supplies a material that is tough, resistant to shock, resistant to corrosion and easily machined. Again, the casting characteristics of the metal permits the parts to be designed with metal placed in areas desired and in the necessary amounts. The castings are true to pattern and are easily and rapidly converted into fittings with sharp, accurate, and clean threads.

The machine setup in fig. 8 for machining malleable pipe fittings is fully automatic. The sole function of the operator is to fill the magazine shown in the left center foreground of the illustration. The casting is automatically chucked, chamfered and tapped, and the tap is backed out and the fitting discharged.

The line of semi-automatics shown in fig. 9 is

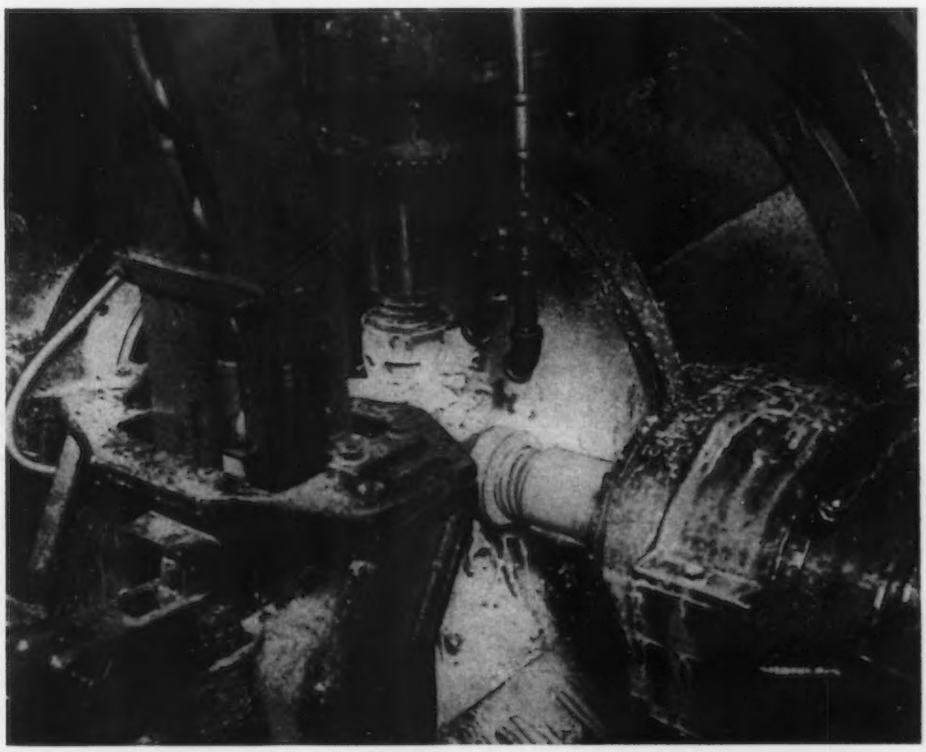

FIG. 8—This machine setup for chamfering and tapping malleable iron pipe fittings is fully automatic. The sole function of the operator is to fill the magazine on the machine foreground.

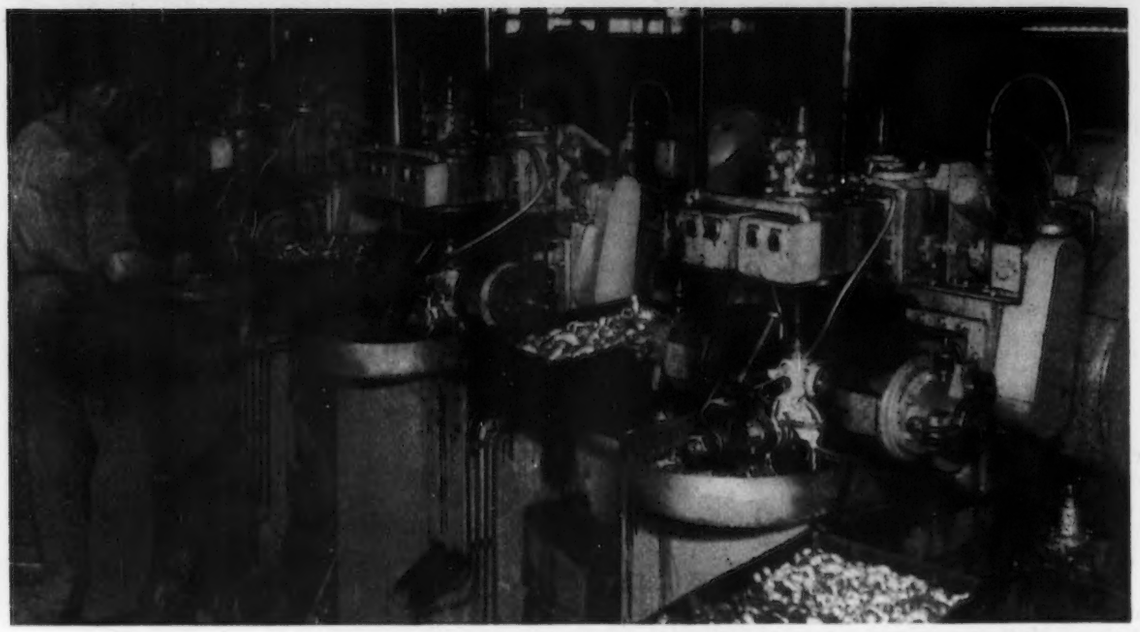

FIG. 9—Malleable iron pipe fittings are manually chucked in these semi-automatics and the machine proceeds through a tapping cycle and stops. The tap proceeds to depth and backs out automatically.

serviced by one operator. The fittings are manually chucked and the machine cycle started by push button. Tapping proceeds to depth, the tap backs out and the machine stops.

Threading and tapping 3 in. Street elbows is another operation handled semi-automatically. The parts are tapped to depth and the tap is automatically backed out and the machine stops. In all of these operations, ground thread, high speed steel taps are used, and soluble oil is employed as lubricant and coolant. Indicative of the speed and facility with which such castings are machined is the machining time required for the overall cycle in tapping 1¼ in. tee's and elbows. The castings, with two or three outlets, are chucked and tapped, taps are backed out, and the fittings are discharged into tote boxes in 10 sec. The outlets are tapped simultaneously.

Heat Treating for Dimensional Stabilization

FEW industrial steel products, made in large quantities, have to be manufactured with fits as close as are required in some components of diesel fuel injection pumps. Such parts are ground within limits only a few ten-thousandths of an inch apart, and are sometimes lapped after honing to provide the necessary close fit. The steel used has to be hardened previously to take and retain the high finish or exceedingly smooth surfaces demanded.

Despite all usual precautions in manufacture of such injection pumps, the Milwaukee works of International Harvester Co. found that in the initial stages of such pump production, some pumps that functioned perfectly during exacting tests failed to do so in normal service. The cause of this discrepancy was finally traced to minute dimensional changes in the steel itself, although it had undergone the usual heat treatment for precision parts of this type.

To prevent such significant dimensional changes in critical parts, most of which are made of SAE 52100 or 51100 steel, the following special heat treatment is employed. It has been found to avoid troubles previously encountered:

After the parts, which include such components as pump plunger and the sleeves in which they are to be fitted, are rough machined, they are stress annealed for 1 hr at 800°F; cooled to room temperature; transferred to a preheat furnace where they are heated to 1150°F; shifted to a second furnace where they remain until they attain a temperature of 1550°F; and quenched in oil held at 100° to 110°F. Both high temperature furnaces are served by Hydrizing units that supply a reducing atmosphere.

After drawing for 1 hr at 350°F, the parts, in baskets, are immediately transferred to a Bowser low temperature unit and are held for 2 hr at —120°F. This deep freezing is followed by a 1½-hr draw at 350°F, after which the parts are cooled in air to room temperature.

This heat treatment results in a fine grain structure and a hardness of 63 to 65 Rc. No significant changes in dimensions occur in prolonged service after this treatment, which is followed by final grinding and, where specified, by honing and lapping.

Tower Warns Steel Men Industry Is Still Target

A. B. HOMER, president, Bethlehem Steel Corp., left, with W. P. Snyder, Jr., chairman, Crucible Steel Co. of America, and one of the speakers, Hugh Morrow, right, chairman, Sloss-Sheffield Steel & Iron Co.

Status of customers' inventories is background for 57th meeting of American Iron & Steel Institute . . . E. D. Martin awarded institute medal . . . Sulfur problem dominates technical sessions

THE steel men who gathered in New York on May 25 and 26 for the 57th annual general meeting of the American Iron & Steel Institute had an entirely different set of problems on their minds than they had had just a year ago. Then it was the production men who were on the spot to get out more steel; today the production problem has switched from quantity to cost and quality. Then government intrusion was a very real and imminent danger; today while the threat hasn't been laid it appears less immediate. Above all, the sales picture has done an about-face since last year's meeting.

One of the industry's top sales executives summed up the changed tone. Pointing to a sign announcing the session on "Increasing Production in the Openhearth," he remarked that this is no time to worry about increasing production. In a way, he was joking. He knows production men are watching costs as they haven't for years. Attendance at the technical sessions was heavy.

In conversations all over the convention hotel, the Waldorf, and in neighboring hostelries where steel men entertained customers and friends use of the word "inventory" was frequent. Everyone was certain steel consumers were working off inventories but the question was "How fast?" No one knew how big consumers' steel inventories are or how long it might take—even at current business levels—to cut them to a "proper" size. Some of the specialty steel companies themselves were reducing inventories, it developed, while other producers were increasing theirs.

That the specter of government interference still stalks the industry was clear from Walter S. Tower's talk. In his annual address the institute president warned that steelmakers will probably remain the target of "economic harpies" and face government intrusion in spite of their high production and large scale expansion. Zealous planners rarely let their ideas die, he noted. He suggested that "little people playing with big ideas" were using steel supply as a peg on which to hang socialized industry plans. Mr. Tower noted that steel supply lines tend to fill faster than expected and that the margin between apparent famine and threatened glut often proves to be very small.

Karl T. Compton, chairman of Massachusetts Institute of Technology and of the National Security Research and Development Board, delivered the third annual Charles M. Schwab memorial lecture. He outlined the research program of the Military Establishment, its study of metallurgical systems, corrosion and stresses. He did a little "day dreaming" on the military possibilities of titanium which, he noted, cannot yet

DR. KARL T. COMPTON, Schwab Memorial Lecturer, center, talks with Bethlehem's Eugene Grace, left, as institute president Walter S. Tower looks on.

• *Annual dinner at the 57th general meeting of the American Iron & Steel Institute held May 26 at the Waldorf-Astoria, New York.*

be produced economically either pure or in alloy form. "But," he added, "I have been given reason to believe that the solution to these problems is already over the horizon, at least within the ordinary hazards of prediction."

Dr. Compton devoted the last half of his talk to strong pleas for support of the Economic Cooperation Administration and of supplying arms to Western Europe. Requirements for all security programs, domestic and foreign, for steel and aluminum will amount in each case to a little over 6 pct of the estimated U. S. output. For copper, he added, such requirements amount to considerably over 15 pct. He also praised the North Atlantic Treaty, pointing out that it carries with it the great advantage of creating a union of nations of coordinated strength and numbers.

Calling his talk "Trend of the Times," because it allowed him to cover a lot of things in a loose-like way, Hugh Morrow, chairman, Sloss-Sheffield Steel & Iron Co., did just that, to the great amusement of his audience. He proved there is nothing new about price control, centralization of power or a lot of other apparently novel trends. In a determined defense of states rights, Mr. Morrow lashed out at federal meddling. (He had already absolved institute members of responsibility for anything he might say.) He cracked a lot of jokes but his serious points were well documented. From the trend of things, Mr. Morrow said, indications are that this country will have to look to the South to save the nation from alien thought and alien action.

Clarence B. Randall, new president of Inland Steel Co., criticized the traditional modesty of the steel industry. Yet steel companies are acutely aware they must find new sources of private risk capital. His solution: Sell steel stocks to workers and farmers on somewhat the same basis that the investment advantages of war bonds were sold. He frankly admitted he did not know how to do it but did suggest a few "bench marks"—such as no employer pressure. By making it a joint venture he felt future financing would be adequately cared for and the public would be with the industry instead of against it.

Professor Sumner H. Slichter, Harvard University, delivered the address at the Industrial Relations Session. He pointed out that productivity has increased but that most of the benefits of the gain have gone to labor instead of into lower prices. The influence of the businessman has been declining for the past 50 years because of the rising influence of labor, he added.

Secretary of Commerce, Charles Sawyer, addressed the annual dinner meeting on the subject of capitalism. "I meet occasionally both in and out of government those who view lightly the effects of some governmental regulation or rule upon business. I am not of that school. I know what toil and worry and sacrifice goes into the building of a successful business. It is hard to create it; it is easy to destroy it," he said. The Secretary warned that if our system is to be preserved, we must be on guard; "we of the government, you of business." He concluded that the two serious problems which government and business must solve concern security of the individual and the twin dangers of inflation and deflation.

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EDWIN D. MARTIN, assistant manager, metallurgical and inspection department, Inland Steel Co., received the institute medal for his 1948 paper on "Continuous Strip Pickling."

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The technical program at the institute meeting consisted of four simultaneous sessions covering such operating and metallurgical phases as increasing production in the openhearth, control of sulfur in steelmaking, research in steel melting, and general research.

In an effort to expose the general status of the sulfur problem and to indicate the nature of the information needed to establish reasonable sulfur specifications, M. Tenenbaum, research metallurgist, Inland Steel Co., Chicago, presented a paper entitled "Effect of Sulfur on Quality and End Uses of Steel Products." The data presented by the author relating sulfur with steel quality were obtained by submitting a questionnaire to some 26 steel plants.

B. F. Fairless awarded Gary Medal. See p. 117.

The effect of sulfur on various steel properties, including tensile strength, hardness, ductility, impact resistance, hot workability, cleanliness, machinability, grain size and grain coarsening, temperature, hardenability, weldability and corrosion, were reviewed. It was pointed out by the speaker that although specific effects of sulfur on individual properties of steel are reasonably well established it is sometimes difficult to interpret these effects in terms of product quality. The quality of any product often involves more than a single property.

The various steels studied were considered on the basis of two categories: (1) The group where sulfur limits are imposed in order to obtain satisfactory performance within the steel plant; and (2) where sulfur must be controlled because of its effect on some property required in the final application.

From data obtained from various steel plants it was possible, for each type of steel, to reduce practically all the data relating sulfur to surface to a common index. To obtain the common index a value of 1.0 was arbitrarily assigned to the con-

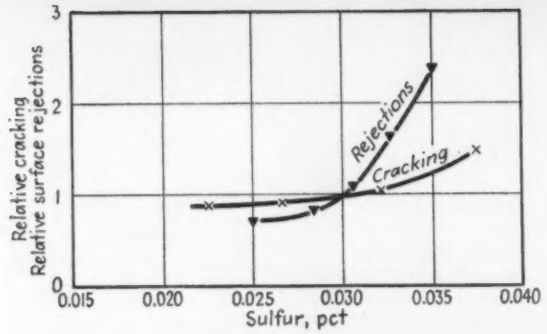

FIG. 1—Effect of ladle sulfur on (1) surface condition of low carbon, aluminum killed, drawing quality steels, and (2) relative cracking of AISI hot rolled alloy steels for cold heading. Corrected to index value of 1.0 at 0.030 pct S.

ditioning effort, surface cracking or surface rejections for steels containing 0.030 pct S. In fig. 1, relating sulfur with the surface of low carbon aluminum killed drawing steel, it appears that sulfur has a more pronounced effect on the surface of killed drawing quality steels than it does on rimming steels. The slope of the curve rises sharply at 0.030 pct S.

Data regarding the effect of sulfur on surface of a cold heading alloy steel are also shown in fig. 1. The general nature of this particular curve is similar to that for plain carbon steels. The increase in surface rejects with increasing sulfur content was small at the low values and increased values somewhat at higher sulfurs.

In a further discussion of the sulfur problem, but taking a somewhat different approach than did Tenenbaum, T. H. Kennedy and A. W. Thornton, general superintendent and division superintendent respectively, Blast Furnaces, Openhearth and Bessemer, and Rolling Mills, National Tube Co., McKeesport, Pa., delivered a paper entitled "Studies Relating to the Control of Sulfur in the Production of Pig Iron." Pointing out that with the consistently increasing demand for lower sulfur iron, the prospect of using coke containing even higher sulfur than at present makes the problem of sulfur elimination a vital one, since it is conceivable that the competitive position of a blast furnace plant may depend upon ability of the operator to cope with this problem.

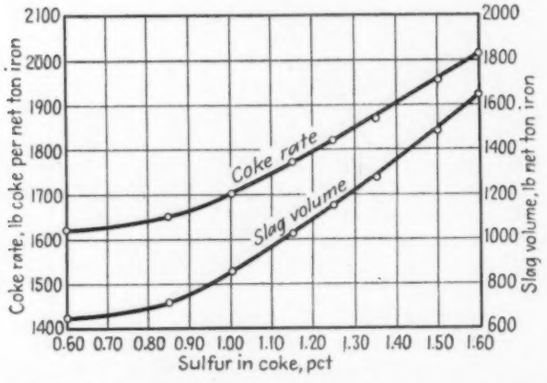

FIG. 2—Effect of sulfur in coke on coke rate and slag volume (calculated).

An increase in sulfur would require additional slag volume and hence additional coke would be required, and barring the possibility that a portion of the loss may be offset by increased blast, an equivalent reduction in iron production may be expected.

If this sacrifice is to be avoided, the only alternate means of eliminating sulfur within the furnace appears to lie in increasing the sulfur-carrying capacity of the slag without venturing into a range of compositions that may render the slag undesirable from the standpoint of viscosity. Fig. 2 shows the slag volume required to maintain a constant percentage of sulfur in the slag when a variation in sulfur is encountered. The coke required per ton of iron for the various percentages of coke sulfur is also listed in this figure.

Up to an optimum level of somewhere between 5 and 8 pct magnesia in the slag, its substitution for lime improves the desulfurization of the iron. The smooth furnace operation and resultant favorable production rate obtained through the use of dolomite in this range indicates its practical value in the present-day situation of increasing sulfur content in the raw materials.

Increased magnesia beyond this optimum range results in a reduction in sulfur-absorbing power, the effect of which is to require the addition of more flux, an increase in slag volume, a consequent increase in coke rate and loss of iron production.

Another interesting paper concerned with the sulfur problem, entitled "Sulfur Control and Manganese Conservation in Open Hearth Furnaces," was delivered by D. E. Babcock, metallurgical engineer, Republic Steel Corp., Youngstown. Regarding manganese conservation and sulfur control as interrelated problems, the speaker discussed first the problem of sulfur control in steelmaking operations, second, the problem of manganese conservation, third, the combined blast furnace and openhearth operating problems, and last, a general solution to the problem.

Asserting that no more than 30 pct of the total manganese which goes through steelplant operations is recovered in useful form, Babcock suggested the following procedures for increasing the recovery of manganese from waste materials: use of openhearth flush slags, use of openhearth tap slags, use of bessemer vessel and ladle slags, use of duplex bessemer slags, and recovery of slags from some ferromanganese operations.

Methods for improving manganese recovery and desulfurization in blast furnace operation were also recommended, involving the use of more basic slags where blast furnace production will not be hurt, lower silicon in the iron without production loss, beneficiated burdens by sizing burdens and sintering, use of higher hot blast temperature, and lower total slag volumes.

For improving manganese recovery and desulfurization at the openhearth furnace, methods were suggested, requiring employment of: Lower slag volumes; limier slags; higher temperatures on sharper, faster working furnaces; fewer ore additions; lower silicon iron; clean scrap by the removal of slag materials; lower hot metal

charges with less ore and more scrap heats in some cases; adequate lime charge at start of heat avoiding other lime additions; no furnace manganese additions; no manganese reboils; utilization of higher temperature—lower FeO slags when possible; and the practice of bringing the heats out of the furnace on rising temperatures to pick up added manganese.

Improving the situation of the ladle with regard to manganese recovery requires that operators (1) tap without furnace slags, (2) tap and control slag running onto the ladles, (3) avoid the use of ferromanganese fines from which little or no manganese recovery is accomplished, (4) use properly sized lumps, and (5) if large additions must be made, preheat them when required.

The relationship of various factors on steel production was discussed by E. G. Hill, director of metallurgy and development, Wheeling Steel Corp., Wheeling, W. Va., in a paper entitled "Increasing Open Hearth Production by Use of Oxygen, Better Refractories and Control of Slag." Incorporated in the presentation were data obtained by the AISI technical committee on open-hearth steelmaking from the major steelmaking firms.

Use of oxygen for oxidizing the carbon in the bath was held by the speaker to possess two distinct advantages: (1) the more rapid carbon drop saves time, and (2) the increased bath temperature increases the fluidity of the slag, undissolved lime goes into solution, and fuel is saved. In fact, some operators find they must reduce the fuel rate during this period. Usually less bank erosion is experienced since the banks are exposed to the high oxide slags for a shorter time.

Disadvantages of the method are: (1) generation of fumes, splashing of the slag, which may erode the roof and front wall, and (2) interference with charging floor operations. When the oxygen is introduced at fairly low carbon content, under 0.30 pct, fumes are not a great problem. This is also true of splashing, although it depends largely on the skill with which the lance or jet is used. Interference with floor operations is a problem that has not been solved, although experimental installations of mechanically-handled jets fed through the back wall or roof are now being tried.

Some interesting variations in the use of oxygen are given in table I, which indicates the practice of 16 plants using oxygen for decarburization on 50 or more heats.

Turning to the use of oxygen for combustion of fuel, Hill noted that the primary advantage is the decrease in heat time, charge to tap, made possible by the increase of amount of heat transferred to the bath per unit time. In order to take advantage of this rapid heat input without damage to the furnace, however, the charge must be able to receive it. Since cold scrap is capable of absorbing the heat as fast as it is available, the general practice is to use oxygen during the melt-down period, or up to the addition of hot metal. Whereas 16 plants reported on the use of oxygen for decarburization, only nine reported on its use for combustion, on series of more than 50 heats, and only three reported its use for both

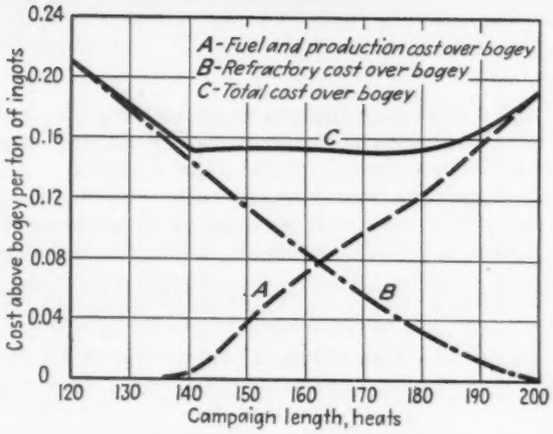

FIG. 3—Ingot cost v. campaign length.

combustion and decarburization. In all cases, a saving in fuel was reported, and in all but one plant, increases of 1.5 ton or more were claimed. All plants reported no lowering of steel quality.

Asserting that a common assumption is the longer the furnace campaign, the lower the refractory cost, and hence, a saving in cost per ton of ingot, the speaker cautioned that against the decrease in refractory cost must be balanced increased fuel cost, loss of production by patching and loss of production by longer heat time as the furnace ages. To explore this matter fully, a study was made at the Steubenville plant to determine the optimum campaign life. Examination of operating data indicated that checker size was the limiting factor to campaign life, since, above a certain number of heats the fuel and varying production costs rose at a markedly increased rate, whereas, refractories cost per ton was the lowest at the 200-heat point. Bogeys were then set up for minimum fuel and production costs and refractories cost. A plot of the data obtained are given in fig. 3, which reveal that a minimum ingot cost is reached at 140 heats. Between 140 and 180 heats the decrease in refractories cost is balanced by the increase in other costs, so that in this particular shop a campaign longer than 180 heats would not be economical.

TABLE I

Variations in Use of Oxygen

No. plants using lance	15
No. plants using jet	1
No. lances used simultaneously:	
Fourteen plants	1
One plant	2
Door through which lance inserted:	
Fourteen plants	2, 3 and 4
One plant	1 and 5
Size of lance, In.	½ to 1
Pipe used per heat, Ft	20 and 280
Oxygen pressure at hose	50 to 175 psi
Oxygen consumed by lance:	
Cfm	187 to 1000
Cuff per ton tapped	20 to 187
Oxygen consumed by jet:	
Cfm	500
Cuff per ton	49
Maximum carbon start oxygen	0.09 to 2.50
Time between stop oxygen and tap, min	5 min to 1 hr 15 min
Increase in tonnage, tons per hr	0.32 to 2.9
Fuel saved, Btu's per ton	60,000 to 500,000

Commercial Production of Sponge Iron

(CONTINUED FROM PAGE 71)

and supervision charges and a share of general plant maintenance and laboratory charges in a small steel plant (100,000 tons a year).

These production costs (table V) compare quite favorably with the price of imported clean scrap in Canada. Whether or not the installation of some sponge iron capacity is justified depends upon present and future conditions for the entire steel industry in a particular country. In Canada, metallurgical coke is almost all imported, electric power is relatively cheap and very satisfactory ore is available. Conditions now, and in the future, are favorable to installation of the Wiberg process in some locations in Canada, especially for the production of melting stock to be used in the manufacture of high quality steels.[8]

In the United States conditions are somewhat different, but this process might prove to be of advantage in some locations. Since the problem of residual alloys in scrap is likely to get worse, this factor alone may justify the use of sponge iron produced by this method in some high quality steel plants where the use of bessemer metal or hot metal is out of the question.

Many ores suitable for feed to the Wiberg furnace are available in the United States and elsewhere. In order to make intelligent estimates of production costs for a given location it is absolutely necessary to perform some experimental work on the ore to be used. Physical characteristics, such as softening temperature and the tendency to decrepitate, combined with the reducibility of the ore, will determine whether or not it can be used and what the production rate will be.

No difficulty is experienced in melting satisfactory sponge iron in openhearth or arc furnaces when it is charged properly. Sponge iron charges as high as 35 pct have been used in acid and basic openhearths using hot metal. In some cases the proper use of sponge iron can result in an increase in steel furnace production rates.[10]

In electric furnace practice, the flow sheet used at Soderfors for high quality steel is ideal. Only 70 pct sponge iron and 30 pct home scrap are charged to the electric steel furnaces (see fig. 2), and only ore of known analysis enters the plant. This simplifies the job of the plant metallurgist since the residual content of the ore and of the circulating scrap is known. Processing difficulties due to variations in residual alloys are minimized.

In locations where scrap and pig iron are not available, or are only available at high prices, it may be possible to produce sponge iron for use as the basis of a very small steel industry of less than 100,000 tons per year. The use of reformed natural gas as the reducing agent is being studied; successful proof of this modification of the process will allow consideration of production of sponge iron in countries having large resources of oil or natural gas, but no coke or coal.

It must be emphasized that data are available to carry out such a study, but it cannot be said without careful examination of all economic factors that production of sponge iron by the Wiberg-Soderfors method is practical and profitable at any given location.

The present situation in Sweden is interesting to producers of high quality steels. The Swedish quality steel industry has been based mainly on the use of charcoal pig iron as a pure raw material, but charcoal pig iron is becoming more and more expensive as charcoal becomes scarcer and more costly. As a result of a study of the problem of manufacturing a substitute for charcoal pig iron in Sweden, carried out by Jernkontorets,[10] it has been concluded that sponge iron is the most satisfactory substitute for charcoal pig iron in the making of quality steels. Coke pig iron is not felt to be as desirable as sponge iron from the purity standpoint. In addition, higher production rates and lower costs were achieved using a suitable sponge iron in the proper manner in different types of steelmaking furnaces, than when using charcoal or coke pig iron in the same furnaces.

Plans are underway at present to build several Wiberg-Soderfors sponge iron furnaces in Sweden, with an ultimate goal of producing about 300,000 tons per year of this material.

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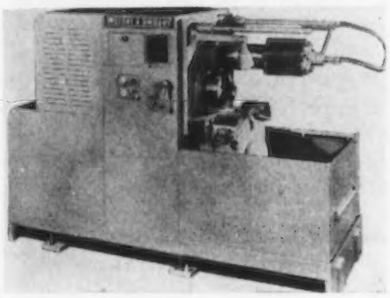
New Production Ideas . . .

New and improved equipment and methods featured in this issue include: An automatic chucking machine, roll turning lathes, a thread roller, a punch press feeder, die cushions, buffing compound applicators, heat exchangers, parts cleaning machines, a grease lubricator, vertical shaft engines, power jacks, metal coating, sealing material, and a free machining steel.

Automatic Chucking Machine

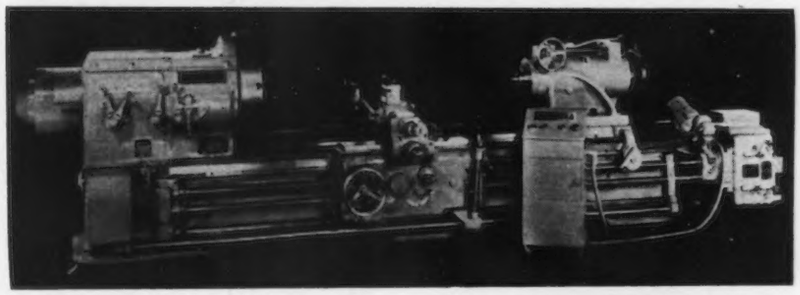
A SINGLE-SPINDLE automatic chucking machine features front and rear cross slides and a five-faced overhead turret, handling work up to 8½-in. diam and



up to 6-in. turned length. Trip blocks set in slots on a pentagonal drum at the rear of the turret shaft control feeds, length of cutting stroke and skip indexing. Either or both cross slides can operate with any or all turret faces, and a quick Allen wrench adjustment controls late and dwell cross slide operations. No cam changes are necessary at any time. For maximum rigidity, bearing surfaces on the turret shaft are limited to two. The turret's location, out of the way of chips, contributes to long-life accuracy. Setup controls include feed and speed selectors, automatic and hand operation switches, and forward, reverse and index push-buttons. Operating controls include spindle and coolant control switches, and cycle start, motor start, and stop push-buttons. Spindle speed range is from 56 to 1498 rpm and eight speeds are available from any given change-gear setup because of the four automatic changes and a high-low shift lever. Eighteen feeds are available, from 0.002 to 0.083 in., and three are automatically available during operation for each gear setup. *Warner & Swasey Co. For more information, check No. 1 on the attached postcard.*

Roll Turning Lathe

CUTTING the machining time by two-thirds on the toughest chilled cast iron rolls is claimed for a tracer-controlled engine lathe designed for turning steel mill rolls. The machine combines improvements in carbide tools with further refinements in Monarch-Keller electrical contouring controls. The lathe will be built in two sizes, 32 and 60 in. Standard carbide turning tools are used with speeds as high as 110 sfpm, the contour of the roll being controlled by a tracer unit that operates both carriage and tool slide feed through magnetic clutches. Round insert-type carbide tools can be used to produce the different shapes in the roll, as long as the radius on the tool is smaller than the radius or radii required on the roll. It is estimated that six or eight turning tools will cover all the shapes required in any one roll shop. Whatever shape is required or whenever a roll needs to be re-cut, the template previously prepared will duplicate exactly the contour originally specified. The headstock has two drives: 16 fast speeds for carbide single point turning, and eight slower face plate drive speeds for form tooling some shapes. Spindle speed range is from 2½ to 505 rpm. The headstock has no gear box or end gearing since all feeds are electrically controlled. *Monarch Machine Tool Co. For more information, check No. 2 on the attached postcard.*



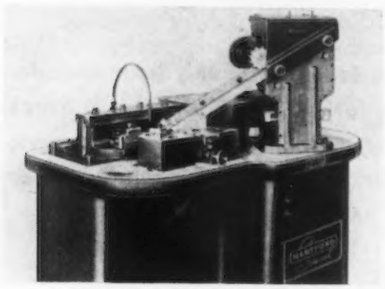
Free Machining Steel

WHEN used in automatic screw-machine operations, a new bessemer steel bar stock, called USS MX free machining steel is said to provide longer tool life and greatly improved surface finish of parts with up to 20 pct increase in machinability over standard bessemer steel bar stock of comparable grade. MX free machining steel has been developed to augment the machining characteristics of Grade B-1113 steel in many applications where that grade is recommended. The new steel performs well in subsequent operations such as forming or crimping the machined parts. MX steel is available in hot rolled and cold finished bars and bar shapes. *Carnegie-Illinois Steel Corp. For more information, check No. 3 on the attached postcard.*

Automatic Thread Roller

A NEW high production thread roller, Model 190-H, for machine screw sizes from No. 2 to No. 10 is designed to produce from

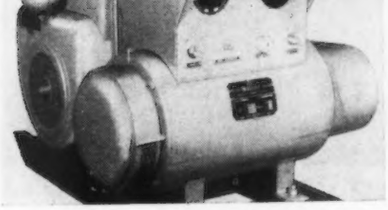
120 to 150 pieces per min. Thread length capacity is ⅛ in. to 1½ in. This machine is said to roll threads on common screws, gimlet point



and self-tapping drive screws, as well as handling special applications. Dies used are standard sizes of the flat type. Die pockets are precision fitted to eliminate the necessity for shimming and squaring. The dies may be adjusted while the machine is running to control thread fit. Dies are changed by unloosening three cap screws. Special features include automatic hopper feed with notched clearing wheel. *Hartford Special Machinery Co. For more information, check No. 4 on the attached postcard.*

Welding Generators

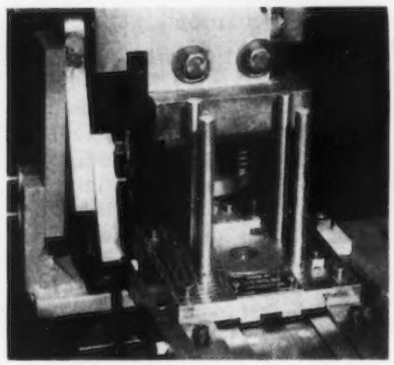
NEW ac and dc welding generators are available as engine driven or electric motor driven units; dc models, available with a welding current range from 30 to 400 amp and the ac models from 15 to 300 amp. The generators feature dual controls, separate excitation, instantaneous voltage recovery and easy arc starting. The en-



gine driven ac models are available with built-in high frequency for Heliarc welding. Both models are powered by either the Wisconsin four cylinder air cooled engine or the LeRoi four cylinder liquid cooled engine. They may be supplied with a road towing trailer for field use. In the motor driven units, the motor is a Miller-built squirrel cage type with cast aluminum rotor, across the line starting, and operates on 220 or 440 v. These models are either stationary or with a steel wheeled running gear for portability. *Miller Electric Mfg. Co. For more information, check No. 5 on the attached postcard.*

Punch Press Feeder

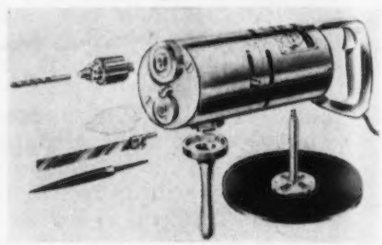
A FEEDER that enables manufacturers of laminate products to utilize the full speed capacities of their presses, inserts the blanks and removes the punchings with positive action, without depending upon gravity to drop the punching clear of the die. For example, with motor laminations, the



rotor disk is punched through the die to a stacking tube, and the stator punching is pulled back out of the die with the feeder slide and then dropped onto conventional matchers. The unit can be swung aside easily and quickly to make die changes. It feeds and removes only one punching at a time. Two or more punchings cannot be fed into the die, nor can they stack in the die, eliminating the need for overload safety precautions to prevent damage to the dies or presses. *Walsh Specialty Co. Inc. For more information, check No. 6 on the attached postcard.*

Tri-Spindle Portable Tool

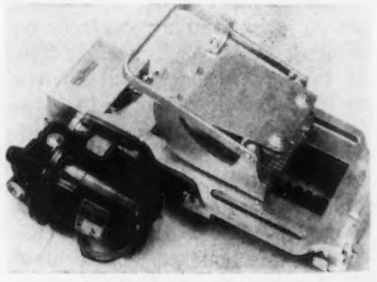
A NEW, multi-purpose, portable electric tool accomplishes drilling, sawing, filing, sanding, polishing, buffing and other specialized applications. Three separate spindles project from the motor housing. The first provides for ¼-in. capacity heavy-duty drilling in metal or ½-in. capacity in hardwood. The second provides a reciprocating stroke ⅜ in. long for hack sawing, filing and key hole cutting, and may be adapted to jig sawing, reciprocating sanders, hammers, etc. The third and bottom spindle can be used for right angle drilling, for sanding and



buffing with disks or for wire brush applications. This spindle also can be used with a flexible shaft or adapted for circular saws. A ¼-in. Jacobs chuck may be used interchangeable on three spindles. Gear reduction can be increased from 5:1 to 10:1 by throwing a Hi-Lo shift. Two spindle speeds are 2000 or 1000 rpm. Instantaneous control of the 110 v ac-dc universal motor is provided with a built-in trigger switch. *Smilan Tool Co. For more information, check No. 7 on the attached postcard.*

Buffing Compound Applicator

IMPROVEMENT in the Nankervis buffing compound applicator consists of enclosing all moving parts by means of Neoprene boots on the feed screw and slides, and by enclosing all gears and adjustments in a metal box. This precludes the possibility of clogging the mechanism with buffing compound, lint, etc. The applicator, weighing 22 lb, can be installed at any angle on any automatic pol-

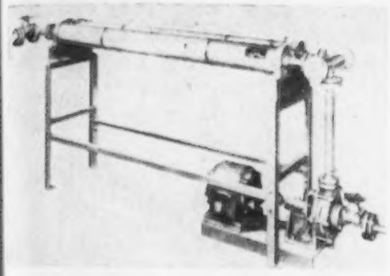


ishing machine. An intermittent feed operates at the rate of 14 strokes per min and can be adjusted to afford the proper amount of buffing compound on each application. The standard carrier accommodates any compound up to 4 in. wide x 2 in. thick x 24 in. long. Special carriers take 6-in. wide or

round cakes. *George L. Nankervis Co. For more information, check No. 8 on the attached postcard.*

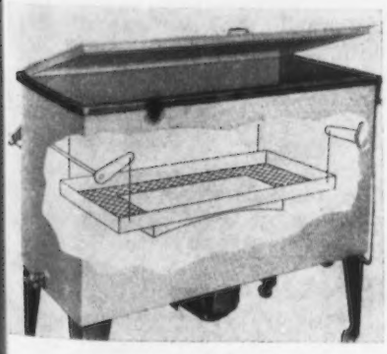
Heat Exchangers

DESIGN and construction of a line of heat exchangers for electroplating solutions permit the use of the same unit for both heating and cooling the solution, as operating conditions require. Pure nickel tubes are used for nickel solutions and steel and special alloy tubes for other applications. These heat exchangers can be furnished as a unit with a combination of one to six tubes in multiple for a wide variety of heat exchange capacity. Special units may be engineered for unusual capacity or space requirements. They are available complete with pump and stand for floor use, or tubes can be obtained separately for wall or ceiling mounting. *Industrial Filter & Pump Mfg. Co. For more information, check No. 9 on the attached postcard.*



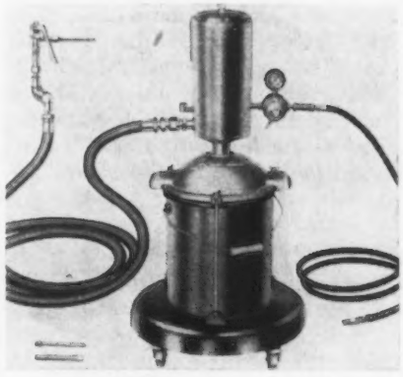
Parts Cleaning Machines

IN a machine featuring an active soak and active wash action, a special tray is automatically raised and lowered into and out of the washing solution, causing a swishing action and easily removing oils, grease and dirt. The tank is steelplate, equipped with a single phase electric motor that operates a levermechanism attached to the loading tray. Dirty parts are placed on the tray above the solution level. The cover is closed, the power released, and the washer runs until the parts are clean, again stopping the tray above the solution level. Cold or hot solutions may be used. Tank capacities are 20, 35, 75 and 85 gal. *Super-Soak Co. For more information, check No. 10 on the attached postcard.*



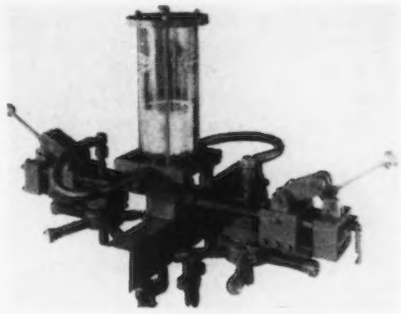
Air-Operated Pump

A HEAVY duty, air-operated Powerflo pump, for pumping industrial fluids and semi-fluids from original 5-gal containers, features a new-type follower plate that utilizes the weight of the pump to insure positive priming at all times. The pump handles gun-grade calking compounds, gun-grade putty, semi-fluid adhesives, sealers, and other materials of similar consistency. It has a pressure ratio of 4½:1, with a double-acting piston to assure continuous flow of material. Material can be applied directly to the work surface from this one-man operated pump or transferred to hand guns. An air compressor capable of delivering 5 cfm at a minimum of 150 lb pressure will operate the pump. A 15 ft material hose of ¾-in. ID terminates in a full-capacity flow gun with jumbo-size universal swivel. Three interchangeable nozzles are furnished for the flow gun. *Gray Co., Inc. For more information, check 11 on the attached postcard.*



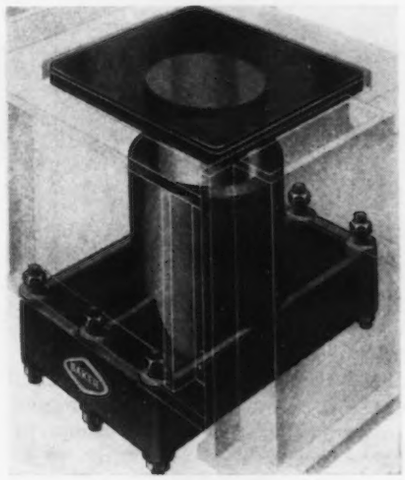
Grease Lubricator

A SIMPLIFIED self-contained grease lubricator for conveyers that are driven by contact with the trolley wheels, uses castings wherever practical. A transparent plastic reservoir performs the dual duty of a liquid level gage. A release lever for taking the lubricator out of service and the option of a spring follower or air pressure on the reservoir for forcing the lubricant into the pumping units are also features of the new model. As a trolley wheel approaches the lubricator the hub engages the sleeve of one of the five pumping units that is automatically brought into contact with the wheel bearing. Continued rotation of the lubricator forces the pumping unit inward, delivering a measured quantity of lubricant through the fitting to the wheel bearing. Process is continuous as long as the conveyer is in motion. The unit will operate on conveyer wheels equipped with or without Zerk hydraulic fittings. *J. N. Fauver Co. For more information, check No. 12 on the attached postcard.*



Die Cushions

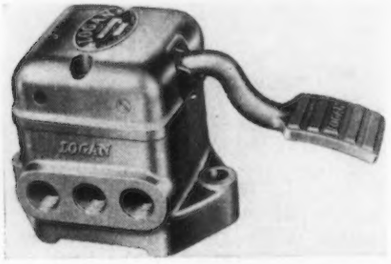
PNEUMATIC and hydropneumatic die cushions for all types of power presses are offered in standard sizes from 4 through 28-in. diam in the single piston type and 10 through 30 in. diam in the double piston type. Size and number of cushions in a given installa-



tion depend on individual press bed construction and pressure requirements. These cushions are self-contained and are manufactured to fit any press regardless of size or make. *Baker Bros. Inc. For more information, check No.* 13 *on the attached postcard.*

Air Control Valve

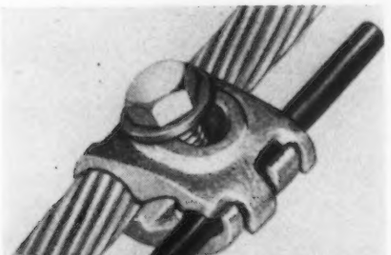
THE new Model 6552 foot-operated, four-way control valve is built in ⅜, ¾ and 1-in. port sizes, for pressures up to 150 psi. Ports and internal air passages are



full pipe size, permitting unrestricted air flow, rapid response and fast operation. The valve cover rotates 90° or 180° to simplify piping problems. Elimination of rod packing reduces maintenance. To replace cup packing, it is unnecessary to remove air lines from the valve or disturb the pipe connections. The valve body and cover are cast iron; the foot pedal is manganese bronze. *Logansport Machine Co. For more information, check No.* 14 *on the attached postcard.*

Parallel Clamp

A TIN-PLATED copper alloy line clamp has been designed for connecting copper, Copperweld, A.C.S.R., steel, or combinations of



these conductors. The clamp features interlocking fingers designed to accommodate a large range of cable sizes. High gripping pressure is provided by a plated steel bolt. *Burndy Engineering Co. Inc. For more information, check No.* 15 *on the attached postcard.*

Vertical Shaft Engine

A VERTICAL shaft type engine, the VS-700, weighs approximately 35 lb, develops 1½ to 1¾ hp, is 4-cycle, extra heavy duty,

carburetor equipped, and available with or without mounting flanges. The engine has needle bearings as main bearings, heavy spring-loaded oil seals, and an adjustable air-velocity governor. Ignition is dust-proof, waterproof and with high-voltage output for quick starting and smooth running at low speeds. *Clinton Machine Co. For more information, check No.* 16 *on the attached postcard.*

Synchronous Motors

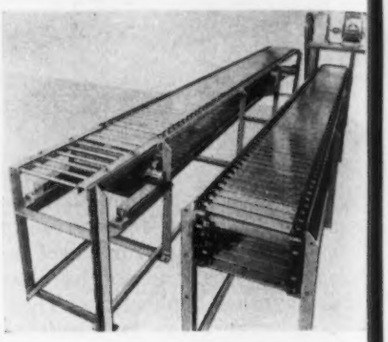
THE new Elinco Model GH-371 hysteresis-type motor for production and laboratory work provides three synchronous speeds in one unit. Operation is switch-controlled providing clockwise or counter-clockwise rotation; it is not only reversible while running, but can also change from one speed forward to a different speed reverse. It is rated at 1/100, 1/60, and 1/40 hp respectively at 900, 1800 and 3600 rpm. It operates from 115 v, 60 cycle, single-phase ac. Dimensions of the motor are 4⅝ in. diam and 5⅞ in. long, excluding shaft. *Electric Indicator Co. For more information, check No.* 17 *on the attached postcard.*

Carbon Bricks

MADE in the large size of 13½x6x3 in., new size carbon bricks are quicker to lay up and have fewer joints to cement. They are easy to handle as they weigh only 14.4 lb. Carbon has no melting point, retains its strength at metal working temperatures, and is highly resistant to slag attack and immune to thermal shock. Other new sizes of carbon brick include a key brick, 13½x6-5x3 in. weighing 13.2 lb, a 9x6x3 in. straight brick weighing 9.5 lb, and the 9x6-5⅜x3 in. key brick that weighs 9.1 lb. *National Carbon Co., Inc. For more information, check No.* 18 *on the attached postcard.*

Apron and Slat Conveyers

SPECIAL conveyers of the apron or slat type are available with wood or steel slats. They are built for heavy duty operation and adaptable to movement of non-rigid ob-



jects such as bags and bales, and to products of unusual contour or shape that must be handled at extreme temperatures of heat and cold. Heavy-duty electric motors with variable speed devices are used to give a wide range of speeds with plenty of power. Conveyers are made to order in units of various widths and lengths. *Sp... Equipment Co. For further inf... mation, check No.* 19 *on the a... tached postcard.*

Electric Drill

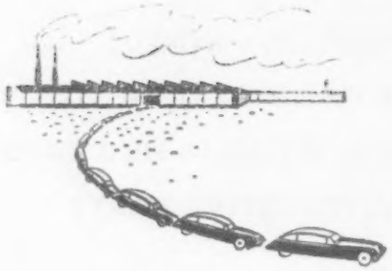
A COMPACT, sturdy drill has been designed for production work where a light weight, small size, ¼-in. drill is required. Built with a surplus power for drilling

in metal, wood and composition materials, the drill can be used at full load for continuous drilling without stalling. Speed is 1800 rpm no load; 1100 rpm full load. Construction features include strong aluminum alloy diecast housing, helical gears, oil impregnated bron...

Assembly Line . . .

WALTER G. PATTON

• GM may be heading for an all-time high percentage of the industry . . . Mr. Sloan tells stockholders GM has no present plans for producing a small car.



DETROIT — The Ford strike, repeated interruptions to Chrysler production and the modest rate of assemblies by independent producers, has focused attention on the production record currently being established by General Motors. During the week ended May 21, GM produced 56 pct of all cars and trucks assembled in this country. Most informed sources are willing to predict that GM will produce 45 pct of the U. S. production this year. The GM total for the year could run very close to 50 pct if ample supplies are available and the Ford strike is prolonged.

For the week ended May 21, Ward's estimates the GM car and truck output in U. S. aggregated 61,240, a slight decrease compared with 62,294 for the previous week. Corresponding figure for a year ago was only 44,704. Earlier in the year it had been predicted that GM would attempt to boost its output 25 to 30 pct. The present increase is 39 pct. For the year to date, GM output is 14 pct ahead of the total for the same period in 1948.

As nearly as can now be determined, automobile producers have just about stopped worrying about steel. A few producers may still be concerned about a few grades of steel. However, most of the car makers are apparently assuming it is good business to get all the high-priced steel on hand into finished cars as rapidly as possible. This plan has the advantage of reducing inventories rapidly. Another step taken by some of the car producers is to sell outright surplus stocks of steel which would move slowly into production lines.

The race by car manufacturers to reduce steel inventories may actually be the key to the present high production of cars and trucks. As some observers see it, the industry is confident it can sell all the cars it can make now; it is not certain the market will be as receptive 6 months from now.

As far as General Motors is concerned, the company appears to have few immediate worries. Its cars have been well accepted. From an engineering point of view, GM is still in front with its high compression engine and automatic transmission. At the moment, the corporation can sit back comfortably behind a 2-year labor contract while Ford and the union tear each other to pieces over a technicality as to whether a Ford worker can be asked—even for a few minutes—to work at a rate faster than the average rate previously agreed upon. Also, from a price standpoint, the General Motors cars are very attractive.

Incidentally, this week's price cut by GM ranging from $10 to $40, while not a large sum, reaches a considerable amount when taken in the aggregate. For instance, with GM production holding at 60,000 cars per week, output for the quarter or 13 weeks would be 780,000 units. Assuming an average cut of $15 per car the anticipated loss in revenue to General Motors amounts to $11,700,000.

o o o

Discusses Small Car

Detroit

• • • **Arguments for** and against a light car have always occupied a good share of conversation in Detroit. With the automobile market fraying slightly at the edges, talk on this subject has recently been revived. Because of its timeliness—and also because it represents the publicly expressed viewpoint of the chairman of the largest auto maker in the world—it is pertinent to review the remarks on this subject by Alfred P. Sloan, Jr., chairman, at the recent GM stockholders' meeting.

Mr. Sloan pointed out to his stockholders that the light car is a perennial problem. It is a business policy problem, however, he said, rather than a technical problem. The policy centers around the fact, he pointed out, that it is impossible to make a car smaller, even considerably smaller, of a size, performance and specifications that the American market has been educated to accept and use and with a money difference in price that makes its acceptance in competition likely. He also pointed out that bigger used cars are always available at prices that no small car can possibly compete with.

The GM chairman said that the somewhat smaller operating cost of the light car is relatively unimportant. Other than low operating cost and facility in parking, the light car has few advantages over the present cars, he implied.

"It is our belief," Mr. Sloan concluded, "that the present offerings in the low price field represent the most effective balance between size, performance, styling and price. We have no *present* plans for bringing into production a smaller car. We continue to study the subject just as we have over many years past."

It will be recalled that several years ago GM hastily dropped its plans for introducing a light car just prior to going into production. The car would have been built in Cleveland.

In his message to GM stockholders, Mr. Sloan indicated that

Confident of working to "millionth" accuracy, this craftsman stacks P&W Precision Gage Blocks to establish a basic master standard for his P&W Electrolimit Height Gage.

HOKE U. S. A.

TWO PRACTICAL WAYS TO PROLONG THE LIFE OF "MILLIONTH" ACCURACY

P&W Precision Gage Blocks are made from an alloy tool steel particularly selected for the purpose. They are given a special hardening treatment that results in a Rockwell Hardness of C67 or higher . . . an assurance of excellent wear life. In addition, the exclusive Pratt & Whitney seasoning treatment gives P&W blocks a high degree of stability. Recommended as replacement for individual blocks subject to considerable use are *P&W Carbide Blocks* whose life greatly exceeds that of steel blocks. Another practical method to protect the accuracy of a set of steel blocks is to use *P&W Carbide Wear Blocks* at both ends of a stack. These are available in sizes .050" and .100", in sets of two or four, furnished in an attractive case.

PORTRAIT OF *Precision*

Precision itself — a set of P&W Gage Blocks, finest precision tools made by Accuracy Headquarters. . . . to establish essential basic accuracy in your plant, and to transfer that accuracy to every phase of metalworking: interchangeable manufacture . . . precision gaging . . . selective assembly . . . quality control.

P&W Precision Gage Blocks are *accuracy's greatest common denominator*, the one factor you need to solve the equation "± Precision = ± Profits."

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GM is watching with interest the present efforts to introduce small English cars into this country. The cars are priced at about the same level as the American low priced cars, he said. About 28,000 cars were imported in 1948 but the number has dropped substantially during the first quarter of 1949, he pointed out.

•

Introduces a Roadster

Detroit

• • • **Chrysler** has decided to buck the trend that sent the roadster into oblivion more than 10 years ago. Production of roadster body types dropped from 322,502 in 1929 to 1134 in 1937. Then the roadster disappeared from the automotive market. The last Dodge roadster was built in 1932. Announcement of the new Wayfarer last week brings back into production the only full size car of this body type.

Except for wheelbase and body details the new Dodge model is similar to other cars in the Dodge line. It has fluid drive, super cushion tires and the new Dodge ignition system as standard equipment. The economy rear axle ratio is 3.73 to 1.

Dodge is apparently relying on the fact that the new model is being offered "at the lowest price of any full size American car." The firm feels it will be particularly attractive to young people and as a second car in two-car families.

There can be no doubt that the new Dodge models represent a substantial improvement over the days when the "One Man Top"—with all its attending delays—was considered to be an engineering triumph. In the new Dodge models, the driver can raise the top without leaving his seat. The framework for the top is constructed of aluminum to facilitate the operation. The new model has plastic side windows, framed with aluminum, which slip into place in the doors. When not in use, the windows are stored behind the front seat. The car seats three persons comfortably in the front seat. A temporary seat is available behind the front seat where the kids can ride comfortably for a short distance.

It will be interesting to watch America's reaction to this new Dodge offering, particularly since all other convertible models are priced at the very top of the range. Incidentally, convertible models are the fastest growing segment of the industry and now account for about 5 pct of all cars sold. In 1940, convertibles accounted for only 2.8 pct of total passenger car sales. However, some observers are pointing out that the 1948 figure may be artifically high because of the desire of car dealers to push their most profitable lines.

GM Introduces Heavy Duty Line of Trucks

Detroit

• • • **General Motors** Truck & Coach Div. this week introduced a new heavy duty line of trucks featuring bigger engines, stronger chassis and roomier cabs than ever before. The latest models are particularly attractive to special equipment users who may require highspeed tractors or use vehicles for logging, concrete mix, oil field work and other extra heavy jobs.

Heavy duty grilles include an in-built spring steel bumper guard. The new channel-type front bumpers are heavier, deeper, wider and stronger. Fenders are made of heavy gage steel.

Compression ratios have been increased from 6 to 1 to 6.5 to 1. Inlet valve seats have been changed from a 45° to 30° angle, and valve lift is increased. Exhaust valves are Stellite-faced and have automatic rotators to prevent sticking, burning and cracking.

The new radiators have an in-built expansion or surge tank. The cooling system is pressurized by a valve which keeps the system sealed against air, preventing boiling at high temperatures and practically eliminates the necessity for radiator refilling.

Compression ratios of the Diesel models have been stepped up to 17 to 1. New tractor-type air cleaners have been installed and air compressors are being supercharged to improve efficiency.

The new heavy duty chassis has deeper and stiffer frame side rails. There is an additional front crossmember and "alligator" type rear crossmember. Heat-treated frames are standard on the large dump and oil field models and optional on other models. Longer and more flexible front springs are specified. There are eight basic rear axle designs. All single and double reduction rear axles up through the 740 series are hypoid instead of bevel design. All have pressed steel housings.

Syncro-Mesh transmissions are standard or optional on all models.

Cabs are all-steel welded units attached to the frame by rubber-cushioned mountings. The cabs are fully insulated and sealed. An inside tool box is standard on the larger cabs.

SCHOOL ON WHEELS: *General Motors has developed a "Mobile Training Unit" for instructing owners and operators of GM Diesel engines. A two tone cab-over-engine truck is the classroom. The truck is equipped with a standard engine, testing apparatus, cutaway sections of principal sub-assemblies, charts, movies, slides and other instructional information. Two instructors handle the assignment.*

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Washington . . .

EUGENE J. HARDY

• Deflationary trends held to increase need for public works shelf . . . Congress already started on program . . . Actual needs uncertain.

WASHINGTON — Economic planners within the Truman Administration have revised their plans, but their ultimate objectives remain the same. Not too many months ago under the alleged leadership of Agriculture Secretary Charles Brannan they succeeded in having introduced in the House the Spence Bill which called for government setting of production goals; price and production controls; government loans for construction of new plants; actual government construction, if necessary; and a whole host of proposals embodying socialistic concepts. This bill was an attempt to carry out the program espoused by President Truman in his State of the Union message. Inflation was the giant to be slain.

In recent weeks, taking cognizance of the falling off in production and employment and the more important fact that the Spence Bill does not have the chance accorded to the proverbial snowball, the group headed by Economic Adviser Leon Keyserling has changed its tune. Deflation is now the bogeyman, but the remedies have not changed a great deal. They are now plugging for legislation which would contain the production goal theory, authorize loans and construction of new plants in key industries, such as steel, and one added provision, not emphasized in the Spence Bill which calls for public works planning as the first step.

Sound public works planning is generally considered to be desirable as a means of warding off severe economic crises. However, Congress will probably be extremely wary when it comes to broad public works planning which involves nationwide distribution of federal funds, for unless such a program is surrounded by proper safeguards it will serve only to further open the door to government control of the economy which was first cracked when Congress passed the Full Employment Act several years ago.

As to public works planning, Congress has already taken steps to authorize the government to spend $40 million to buy sites and prepare plans for federal building outside the District of Columbia and an additional $30 million for repair of federal buildings. The legislation is designed to set up a storehouse of plans to be fulfilled when "a Government building program may become necessary or desirable because of economic conditions." This measure has already passed the House and Senate.

CONFORMING to the policy of adequate public works planning, the Federal Works Agency, which has generally remained aloof from the more leftist elements in the Truman coterie, is plugging strongly for enactment of a reasonable facsimile of the Advance Planning title, now expired, of the War Mobilization and Reconversion Act of 1944. This permitted FWA to advance money to state and local agencies for public works planning.

The FWA wants to get started on proposed work which has come to be accepted generally as federal responsibility. Renewal of the Advance Planning authority would get the envisioned program off to a good start — in effect, lay the groundwork for a huge WPA program.

"Need for public works—schools, highways, hospitals, water lines, and so on—has been accumulating for a long time," FWA officials say. "They were postponed during the war to divert men and material to the war effort. Again they were postponed for housing and new industrial and commercial facilities."

As background, there is a belief among administration planners that the government should be ready to step in and take over when and if total unemployment figures reach 4 million. Headed toward that figure earlier this year, spring recovery took up some of the slack and reduced the jobless figure to the 3 million level.

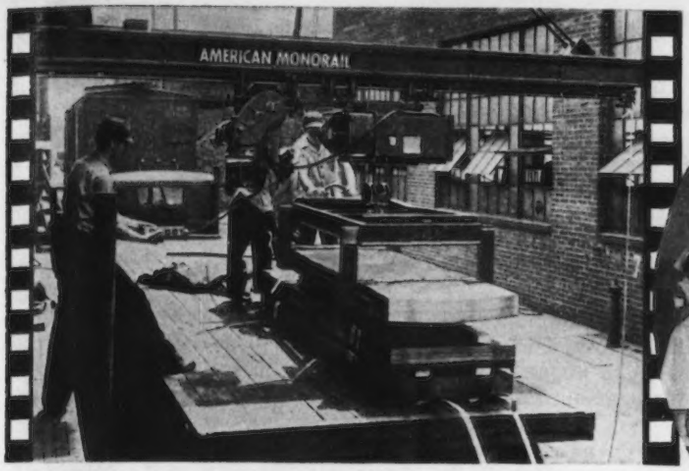
This total is about a half-million higher than this time last year and in itself not generally considered alarming. But there are other sides to the picture.

One is that government employment services report that while seasonal recovery has been reducing the number of new claims for jobless compensation, on the other hand the periods between jobs have been growing longer.

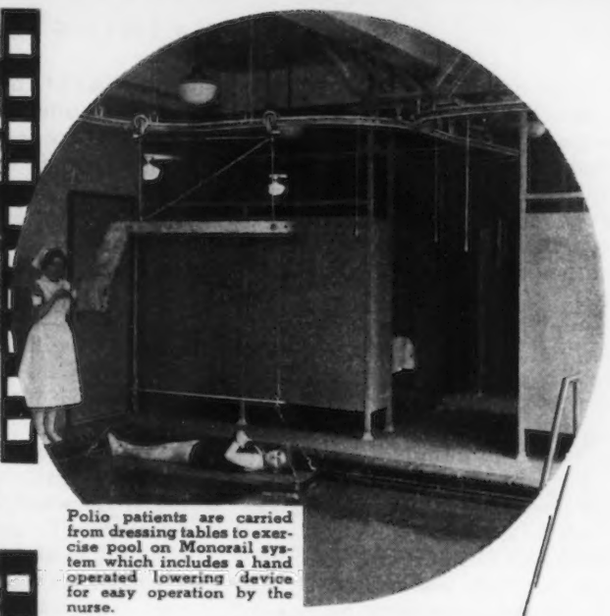
ALSO, the pattern is changing. With a continued heavy demand for motor vehicles, employment in the automotive fields is higher than a year ago. The same trend is true for trade employment and government jobs. In construction, employment is holding to last year's levels. But in steel, nonferrous metals, machinery and some other industries, the trend is downward.

And should privately financed construction fall flat on its face, or the nation be faced with wide-scale unemployment, the FWA is afraid that there is not a big enough "reserve shelf" of public works projects to take up the slack.

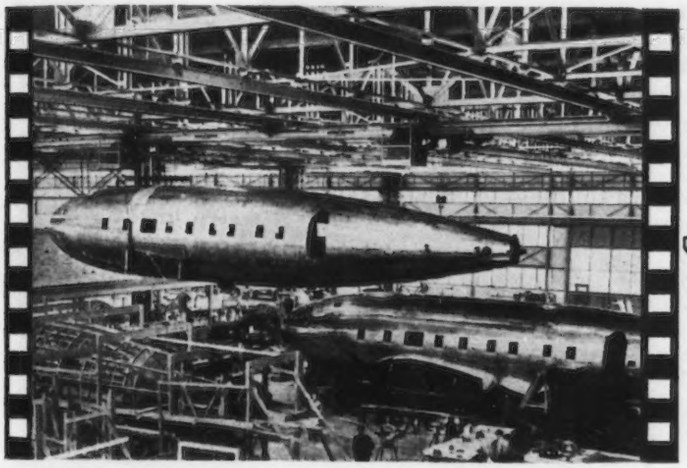
"We are not asking that a large program of public works be started



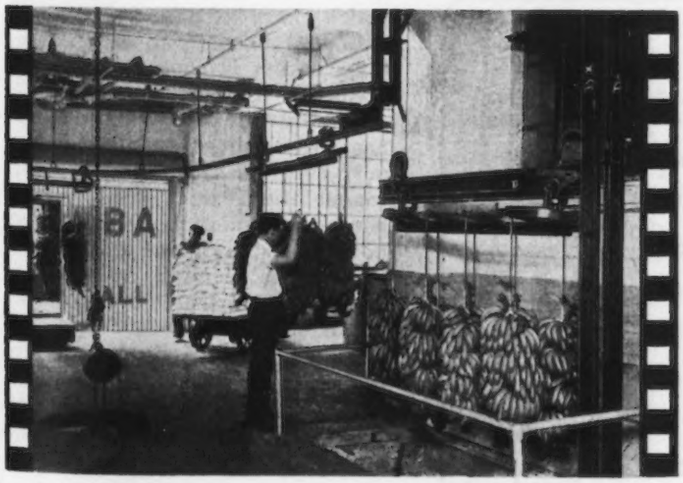
Another demonstration of the MonoTractor drive includes a swinging jib for passage of the carrier over a truck for removal of 2 ton bundles of sheet steel. An electric hoist and a Windsor sheet grab are used.



Polio patients are carried from dressing tables to exercise pool on Monorail system which includes a hand operated lowering device for easy operation by the nurse.



This twin-bridge 5 ton crane is 160 feet long operating on 9 runways. Two carriers, each centered between a pair of crane trucks, can make a lift of 10 tons as shown.



Fruit, unloaded from cars on special trolley racks, rolls around MonoRail curve to a drop section where the racks are lowered to basement tracks. The racks then roll by gravity to ripening rooms.

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at this time," J. W. Follin, assistant FWA administrator, says, "nor are we forecasting the future trend of business. But the effective use of public works depends on an adequate reserve shelf of worthwhile public projects. We do not now have that effective reserve shelf."

Indications are that the 1949 building total will fall less than $1 billion short of 1948's $18 billion plus. But there again is a shifting of patterns.

Industrial building has shown a downtrend for months and is now below the $100 million monthly average. While the unit rate of residential building may go higher than in 1948, dollar volume will remain about the same because of lower costs and the trend toward cheaper homes.

But even more significant is the changing financial pattern. Privately financed projects are down for the first 4 months, public construction is up.

At this time last year, private financing accounted for 82 pct of all construction. Now, the percentage has dropped to 76 pct. Thus, use of public funds has increased from 18 to 24 pct of the total.

INDUSTRIAL money which went into building plants last year is now going into equipping those plants as they are completed. At the same time, more public funds are going into highways, institutional construction (hospitals, schools), and even into public housing. Indications are that the number of publicly financed dwelling units will be increased from last year's 15,000 to about 45,000.

Estimates of the amount of needed public works vary up to as much as $100 billion, depending on who does the estimating. But it is pretty generally agreed that the backlog of approved projects amounts to about $5 billion.

Industrial sources place the total value of *proposed* governmental projects (backlog) at about $27 billion, including such projects as the St. Lawrence Seaway and various river control programs. These same sources estimate the amount of *approved* projects at about $13 billion—of which many are awaiting appropriations.

However, since so-called long-range and reclamation projects easily account for two-thirds of the total, the FWA considers that the actual public works reserve backlog amounts to only about $4.5 billion. It arrives at its figure in this way.

There are about $1 billion in ready-to-go projects which were left over from the previous Advance Planning program. Another $600 million in local plans have been completed with federal help. Approved local and state highway projects have been laid out for another $900 million to bring the total to $2.5 billion. Plans completed for direct federal civil construction amount to $2 billion.

The present expenditure rate for public works is running at around $4 billion annually (including federal, state and local). Using the FWA estimates, the backlog of approved projects could easily disappear within a year without any radical change in the picture.

While the legislation referred to above is in line with FWA recommendations, the agency is not happy about the sum of $40 million.

"This is a step in the right direction," the agency says, but adds plaintively that it "will provide plans for only $450 million worth of building at current prices."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Adds New Export Items

Washington

• • • **Water-closet sets** and metal window frames and sash have been added to the list of products which may be exported without validated licenses to all destinations except Europe and adjacent areas (R Group countries).

The Office of International Trade has also removed quantitative export controls from the following commodities: steel prefabricated houses, aluminum prefabricated houses, cast iron soil pipe and fittings, metal conduit and fittings, and metal fabricated door frames. Exporters must continue, however, to secure validated licenses covering shipments of these products to all destinations, and must also observe all other applicable export regulations.

Canaday Now Adviser

Washington

• • • **Ward M. Canaday** of Willys-Overland Motors, Inc., has been appointed adviser to the chairman of the NME Munitions Board on matters pertaining primarily to the industrial planning programs of the board.

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West Coast . . .

ROBERT T. REINHARDT

• Shasta electric furnace pilot plant continues experiments on local ores but no commercial possibilities developed . . . Millions of tons of Canadian mine tailings may yield iron.

SHASTA DAM, CALIF.—Here at the foot of the world's second highest dam a staff of ten men headed by C. Travis Anderson, supervising engineer for the U. S. Bureau of Mines, continues to explore the commercial possibilities in utilization of Shasta County mineral deposits.

With power available at 4 mills per kilowatt-hour from the generators of Shasta Dam and with deposits of iron ore, chrome, manganese and tungsten close by, this pilot plant is well situated for this experimental work.

One 5-ton Heroult and one ½-ton Lectromelt electric furnace have in the past 2 years produced considerable tonnages of steel from Shasta County ores which had first been shipped to the U. S. Bureau of Mines' plant at Laramie, Wyo., for conversion into sponge iron.

Much of the steel produced in the pilot plant has been converted into rounds and small shapes by California mills to determine its workability and quality when subjected to commercial processing. According to bureau officials, results to date have been extremely encouraging although there is little indication that local ores are readily available in sufficient quantities to warrant the establishment of a commercial steel producing plant in this area.

Principal iron ore deposits in Shasta County are located about 12 miles north of Redding in the extreme southern part of Klamath Mountains and are now isolated from the principal highways by waters impounded behind Shasta Dam. They must now be reached by boat or barge.

As early as 1892 ore was taken from these mines and between 1907 and 1926 the ore was mined for the Noble Electric Steel Co. which had a plant adjacent to the deposit where the ore was reduced in an electric furnace. During the recent war this ore was mined for use as ballast at the rate of approximately 100,000 tons per year.

It is estimated that there are approximately 1½ million tons of high-grade magnetite running better than 60 pct iron in these deposits. However, based on the experience gained during the mining operations to secure ballast, it is apparent that recovery of this high-grade material would have to be done on a very selective basis and entail moving considerable quantities of low-grade ore and waste.

The pilot plant has been in operation since March of 1946 and is sustained on a year to year basis by appropriation.

THE low power rate of 4 mills per kilowatt-hour enjoyed by the pilot plant is mighty attractive to operators of commercial steel furnaces throughout the state. In northern and central California the power rate for electric furnace operations fluctuates with the price of crude oil and at present varies from a high of $0.0154 per kilowatt-hour for the first 20,000 kilowatt-hours per month and drops when the aggregate kva capacity is 1300 kva or more to the point where all used per month in excess of 300 kilowatt-hours per kva of furnace ratings is at $0.0064 per kilowatt-hour.

In southern California large electric furnaces are operating at a rate of approximately $0.0065 per kilowatt-hour.

At the Los Angeles rate and assuming 550 kilowatt-hours per ton for melting, the cost per ton would be approximately $3.58, and at the rate paid by the Bureau of Mines to the Bureau of Reclamation a cost of $2.20 per ton for melting. This comparison is more theoretical than realistic since the Bureau of Reclamation producing power at Shasta and Keswick Dam, just about 9 miles south of Shasta, lacks the necessary transmission and distribution systems to make power available at steel production centers. It should also be borne in mind that even if bureau power could be delivered to central California steel producers it probably would not be at the 4 mill figure since transmission costs and losses would have to be taken into consideration.

Shasta Dam is now fully equipped with five generators of 75,000 kw capacity each and three generators at Keswick Dam of 25,000 kw each are scheduled to be ready for operation in the middle of 1950. The bureau hopes to get at least one of the three generators at Keswick in operation by December of this year if the power load demands it.

Bureau of Reclamation officials are quite frank in stating that power production is of secondary importance in the central valley project of which these two dams are key structures and the primary function of this $440 million development is to conserve water and promote agricultural development in the central valley of California.

This huge project involving Shasta, Keswick and Friant Dams and four major canals and the world's second largest pumping plant has already utilized an estimated 200,000 tons of steel and probably will need about 150,000 additional tons before the project is completed.

•

Expands Aircraft Plant

Los Angeles

• • • **Expanding operations,** Northrop Aircraft, Inc. has leased a $350,000 key warehousing plant on a long-term basis from Pacific Iron & Steel Co.

The first unit of the plant already has been started by the steel company on a 10-acre site and was

to be ready for occupancy by June 1. When the overall warehousing project is completed, it will have 254,861 sq ft of floor space.

The building will be used for the storage of raw materials for aircraft production at the mile-long, mile-wide Hawthorne plant of Northrop nearby where Flying Wings are being turned out under government contract.

•

Small Concerns Adopt Aggressive Programs

Los Angeles

• • • **Smaller iron** and steel foundries are following the lead of larger concerns in adopting aggressive sales programs to combat the 1949 lull in the market and several will participate in a National Home and Building Exposition in Los Angeles in early June, exhibiting iron and steel home materials varying from bathtubs to steel cabinets.

The meeting will have exhibits on all phases of homes and sessions for men interested in construction. One session will be closed to discuss the new trend with materials now available in plentiful lots. Chief speaker will be Thomas S. Holden, president of the F. W. Dodge Corp. Special sessions will be held for sheet metal contractors.

On the same plane, auto, truck and trailer companies will participate in a National Truck, Trailer and Equipment Show scheduled June 15-18. National truck and trailer companies will attempt to give new impetus to slower sales.

In a new trend in building, which calls for the use of more steel for reinforcing, Metropolitan Life Insurance Co. is spending $40 million for several height-limit apartment structures, covering several square blocks. Most apartments in southern California have been 2-story not calling for steel reinforcement contracts.

•

California Ranks Second In Number of Factories

San Francisco

• • • **That much** of the hoop and hurrah about the rapid industrialization in the West has basis in fact is shown in the cold statistics compiled from the 1947 census of manufacturers by Carleton Green, regional economist for the U. S. Dept. of Commerce. Although these figures are already 2 years old and do not reflect development during the last 2 years, they show that California now has more factories than any state in the union with the exception of New York; and that while in 1939, 6.7 pct of all factories in the country were located in California, by 1947 this state accounted for 7.3 pct of the total.

In 1939 the average California factory worker added $4129 in value to the material and supplies which he processed which was then 32 pct more per employee than the U. S. average. In 1947 the average California factory worker added $7540 in value, or 21 pct more than the U. S. average.

One of the reasons industrialists in the West have difficulty in successfully competing with eastern competitors may be found in that annual salaries and wages of manufacturing employees here average $3125 which is 13 pct above the $2776 national average. Production workers received an average of $2881 during 1947 in California, which is 14 pct more than the $2538 national figure, and worked 1 pct less hours.

•

Interest Shown in Mine Tailings Containing Iron

Portland, Ore.

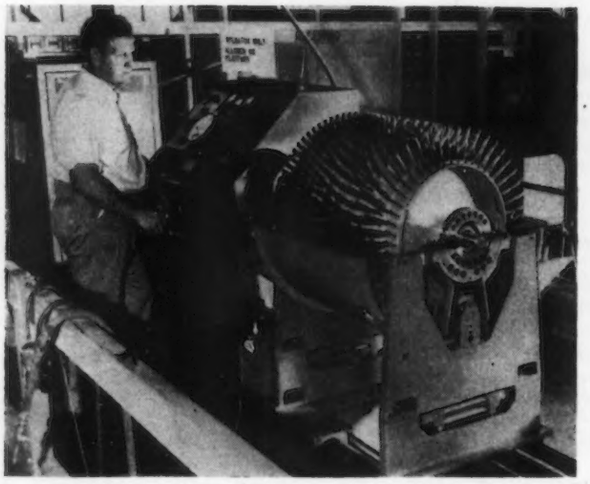
• • • **Industrialists** of the Pacific Northwest are expressing interest in the project of the Consolidated Mining & Smelting Co. of Canada, Ltd., which is to investigate the possibility of large-scale iron production from tailings stocked at the company's concentrator near Kimberley, B. C.

According to W. S. Kirkpatrick, assistant general manager, approximately 30 million tons of iron concentrate running about 50 pct iron is available for reduction. The plan now is to treat these concentrates to remove sulfur which would be converted into sulfuric acid for use in the company's chemical fertilizer plants. A pilot plant is to be constructed for the purpose of determining the effectiveness of treating the tailings in electric furnaces using power available from the company's plants on the Kootenay River.

Cominco has been mining the Sullivan Mine at Kimberley since 1910 and is currently taking from it about 2¼ million tons of iron, lead and zinc sulfide ores. More than 50 million tons of ore has been taken from this mine already. Approximately 2 oz of silver in addition to some antimony, bismuth, cadmium and tin are recovered per ton.

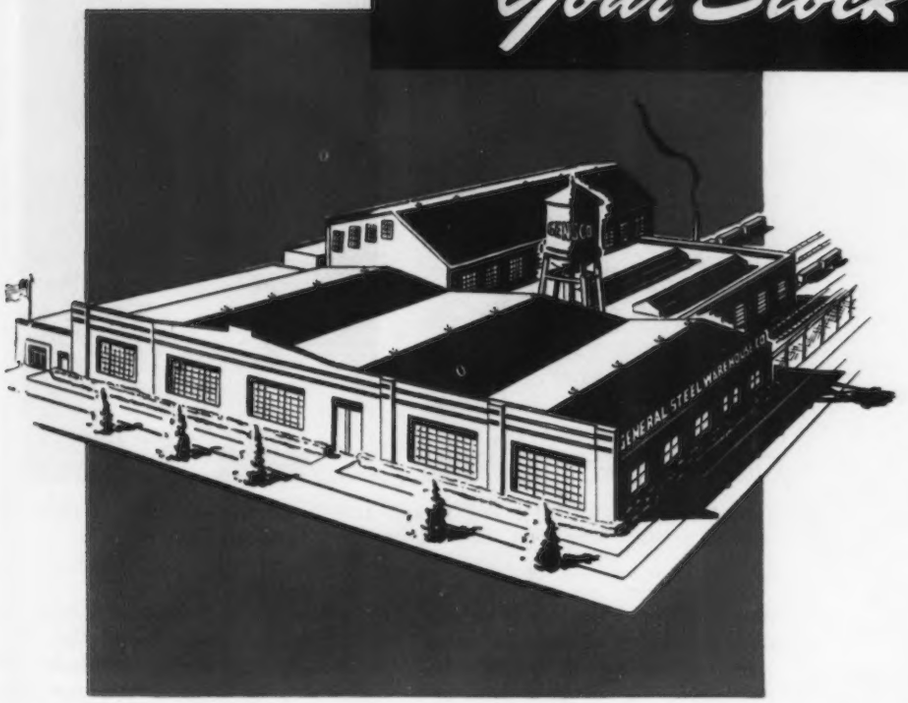
Cominco produces approximately 6 million oz of silver per year which is about one half of the total produced in Canada. The company also produces about 450 tons of lead and 350 tons of zinc per day.

Concentrates are refined at Trail, B. C., 200 miles from the mine.



JET PROPULSION: *Keeping pace with the era of jet propulsion, the U. S. Naval Air Station at Alameda, Calif. is now centering many of its activities around a jet engine overhaul shop. One of the toughest operations in overhauling the jet engine is the careful balancing of the compressor rotor. W. J. Irish is shown measuring the unbalance in one of these high speed rotors on a Gisholt Model JP Balancing Machine.*

"Your Stock Room"



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PERSONALS

o o o

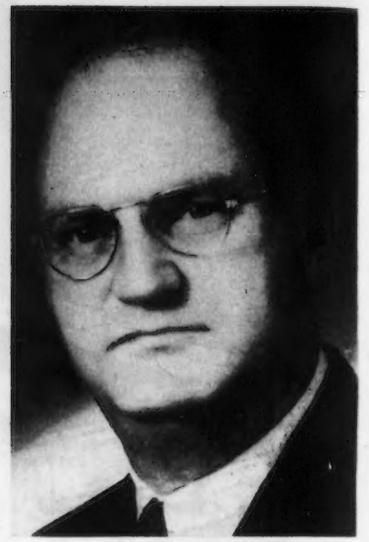
• **William F. Zerbe** has been appointed to the newly-created position of vice-president in charge of operations of Central Iron & Steel Co., Harrisburg, Pa., with which company he has been associated for 38 years. Mr. Zerbe has been succeeded as general manager of plant operations by **H. M. Jones**, his former assistant.

• **Roy C. Rhodes,** formerly manager of sales of the Charlotte, N. C., district sales office, Tennessee Coal, Iron & Railroad Co., has been appointed manager of sales at the company's Memphis district sales office, succeeding **George R. Mitchell,** who has resigned. **John G. McCleery,** formerly sales representative for TCI in Shreveport, La., has succeeded Mr. Rhodes in Charlotte.

• **Ronald G. Lane** has been named comptroller, Gerrard Steel Strapping Co., Chicago, a U. S. Steel subsidiary, succeeding **B. H. Browne,** who has resigned. Mr. Lane joined Gerrard in 1940 as an accountant and had been chief accountant since 1945.

• **George L. Williams,** supervisor of the order department of the Youngstown office of Youngstown Sheet & Tube Co., has been appointed assistant manager in charge of the department's western division in Chicago. **Dave Lewis,** supervisor, has been named assistant manager for the eastern division with offices in Youngstown. **Fred C. Dyer,** clerk, has been appointed chief clerk in Youngstown.

• **Leslie J. Woods** has been appointed vice-president, director of research and engineering, Philco Corp., Philadelphia. Mr. Woods joined Philco in 1925. In 1928 he was named first television engineer and served in this capacity for two years. Since 1948, Mr. Woods has served as vice-president of the company's industrial division. **David B. Smith,** vice-president, research and engineering, has been named to assist Mr. Woods.



NICHOLAS M. DuCHEMIN (left), and JOHN W. BELANGER (right), assistant general managers, Apparatus Dept., General Electric Co.

• **John J. Maschenic** has been appointed manager of export sales of the Wheeling Steel Corp., Wheeling, W. Va., with headquarters in New York. Mr. Maschenic began with Wheeling Steel in 1929. He joined the export department in 1937.

• **Samuel Wit,** who has been sales engineer with Lukenweld, machinery-making division of Lukens Steel Co., Coatesville, Pa., has been named district manager of sales of Lukens Chicago office, effective July 1. Mr. Wit has been associated with Lukenweld since 1937 as a draftsman and engineer. In 1947 he was named sales engineer with the division, which position he held to the present.

• **George H. Tully** has been appointed in charge of metal powder sales, Metals Disintegrating Co., Inc., Elizabeth, N. J. Mr. Tully had formerly been manager of metal powder sales of the Metals Refining division of the Glidden Co.

• **George A. Burgermaster** and **C. Russell Todd** have been appointed assistant purchasing agents of Hyatt Bearings division of General Motors Corp., Harrison, N. J., to fill vacancies created by the retirement of **William E. Jones** and the recent promotion of Leo V. Farrell, who has been made general purchasing agent, succeeding Frank A. Weiss, who is now assistant to the general manager.

• **John W. Belanger,** manager of the turbine division of the General Electric Co., Schenectady, and **Nicholas M. DuChemin,** manager of the company's meter and instrument divisions at Lynn, Mass., have been named assistant general managers of the G.E. apparatus department. Mr. Belanger started with the company in 1917. Mr. DuChemin has been with G.E. since 1914. **Glenn B. Warren** has been appointed manager of the turbine divisions, succeeding Mr. Belanger. Mr. Warren had been manager of engineering of the turbine divisions of the apparatus department in Schenectady since 1947. He joined G.E. in 1918. **C. W. La Pierre,** vice-president in charge of engineering for the American Machine & Foundry Co., has been appointed assistant manager of the aircraft gas turbine divisions at Lynn, Mass., for G.E. **W. F. Rauber** has been appointed manager of sales for the Switchgear divisions of G.E.'s apparatus department in Philadelphia. Formerly assistant manager of the sales division, Mr. Rauber succeeds **J. D. Hoffman,** who has been named sales manager for the air conditioning and commercial refrigeration division of the air conditioning department at Bloomfield, N. J. **James H. Goss** has been made manager of engineering in the control divisions of the apparatus department. Mr. Goss has been with G.E. since 1931, and had been assistant manager of engineering since 1947.

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EVERETT S. BISSELL, vice-president, Patterson Foundry & Machine Co.

• **Everett S. Bissell** has joined Patterson Foundry & Machine Co., East Liverpool, Ohio, as vice-president in charge of sales, research laboratories, chemical engineering and process engineering. Mr. Bissell had formerly been vice-president and general manager of Mixing Equipment Co.

• **Robert F. Myers** has been appointed general sales manager of Lees-Bradner Co., Cleveland. Mr. Myers had previously served the company in the capacity of sales engineer.

• **Dr. Max R. Burnell** has been appointed medical consultant to General Motors Corp., New York. Dr. Burnell, a practicing physician in Flint, Mich., for 28 years and medical director of AG Spark division of G.M. since 1931, succeeds **Dr. Clarence D. Selby,** who is retiring after 14 years as G.M.'s medical consultant.

• **L. M. Greenleaf,** assistant chief hydraulic engineer, has resigned that position at the Aluminum Co. of America, Pittsburgh, and has become associated with International Engineering Co., San Francisco.

• **Raymond C. Firestone,** vice-president of Firestone Tire & Rubber Co., has been appointed in charge of research and development. Mr. Firestone has his headquarters in Akron, Ohio.

• **William M. Marriott** has been appointed president and **John L. Ramsey,** vice-president of E. J. McAleer & Co., Inc., Philadelphia. Mr. Marriott joined McAleer in 1946 as comptroller and has served as vice-president since 1948. Mr. Ramsey has been with the company 25 years and in addition to his duties as vice-president continues as sales manager.

• **Grover J. Meyer** has been named president and director of the Lombard Corp., Youngstown, succeeding **D. L. Lombard,** who is now chairman of the board. Mr. Meyer had previously been president and general manager of the Renner Co. and had formerly been with The Arnold Co., American Radiator Co. and Truscon Steel Co.

• **H. E. Dralle** has been appointed assistant manager, eastern engineering and service division, located in New York, for Westinghouse Electric Corp., Pittsburgh, and, effective July 1, succeeds **S. L. Henderson,** who is retiring as eastern engineering and service manager. **M. L. Gardner** has been appointed assistant engineering manager, district engineering and service department. He became engineering manager succeeding **D. E. Inman,** who has been transferred to the northwestern district. Mr. Gardner is located at the East Pittsburgh works. **George M. Woods** has been appointed manager of the transportation section industry engineering department, succeeding Mr. Dralle.

• **Robert J. Brown** has joined the staff of Dearborn Motors Corp., Detroit, as business manager. He came to Dearborn Motors from Motor Products Corp., Detroit.

• **Harold J. Zilske** has been appointed sales engineer in the Philadelphia area for the Parker Appliance Co., Cleveland. Mr. Zilske had previously been connected with Anchor Coupling Co.

• **Henry T. Schlachter** has been appointed Detroit representative for Detroit Broach Co., replacing **Earl Hovey,** who has retired. Mr. Schlachter had formerly been midwestern field manager for the Cimcool division of Cincinnati Milling Machine Co.

TOM W. RYAN, manager of operations, Basic Refractories, Inc.

• **Tom W. Ryan** has been appointed manager of operations, Basic Refractories, Inc., Cleveland. Mr. Ryan is a former executive vice-president and director of the St. Johns River Shipbuilding Co. Prior to that he had been associated with Thompson-Starrett Co., where he rose from the ranks to the position of vice-president.

• **Frederick L. Seibold** has been appointed sales manager of Schutte & Koerting Co., Philadelphia.

• **F. Ashton Smith** has been appointed foil product manager for Permanente Metals Corp., Oakland, Calif. Mr. Smith is a pioneer in the foil field, with 20 years' experience in production and applications. He operated his own business in New York prior to joining Permanente. **John E. Menz** has been named product manager, electrical conductor, directing the sales of Kaiser aluminum cable and other products of Permanente Metal's rod, bar, wire and cable plant at Newark, Ohio. Mr. Menz has been with the company since 1946. He continues his headquarters in Oakland. **Frank J. Wood** has been named chief plant engineer for the fabricating division of Permanente Metals. Mr. Wood is a veteran rolling mill engineer. He had previously been associated with Loewy Construction Co., Goodman Mfg. Co. and Mesta Machine Co.

JAMES L. CRAWFORD, president, Walsh Refractories Corp.

• **James L. Crawford,** formerly vice-president and general manager, has been made president of Walsh Refractories Corp., St. Louis, succeeding **N. S. C. Walsh,** who has been appointed honorary chairman of the board. Mr. Crawford, who has been with the Walsh Corp. since 1932, entered the organization as general manager.

• **Walter R. Konkle** has retired as head of the Decker Mfg. Co., Albion, Mich., to become chairman of the board. **John W. Lougheed** has been appointed president and **Edwin W. Konkle,** executive vice-president.

• **Leetate Smith** has been appointed general sales manager of Palmer Mfg. Corp., Phoenix, Ariz.

• **Gloyd M. Wiles** has been appointed manager of the newly-established mining department of National Lead Co., New York. **Allan R. Reiser** has been appointed assistant manager. Mr. Wiles is also manager of the company's St. Louis Smelting and Refining division. Mr. Reiser is assistant manager there. **George A. Savage** has been appointed manager of the metal division of National Lead of Massachusetts and **Karl Fischer** has been named manager of the pigment division. Mr. Savage began his career with the E. W. Blatchford Co. branch, serving 11 years. In 1947 he became vice-president of National Lead of Massachusetts. Mr. Fischer joined the company in 1918, becoming vice-president in 1940. **Frank R. Milliken** has been appointed assistant manager of the company's titanium division, with his headquarters in New York. **George W. Wunder** succeeds Mr. Milliken as plant manager of the MacIntyre development at Tahawus, N. Y., and **Paul W. Allen** became assistant plant manager. Mr. Milliken has been with the company since 1941 and in 1948 became plant manager of the MacIntyre project. Mr. Wunder joined National Lead in 1948 and had been assistant plant manager of the MacIntyre development. Mr. Allen began work on that development in 1942 as resident engineer. He had been general superintendent there since 1948. **Philip C. Muccilli** has been named assistant production manager for National Lead Co., supervising the operation of the company's metal plants. He joined the company in 1920. **Michael Howard,** assisted by **Charles Gumucio,** have been placed in charge of the consolidated metal and pigment divisions of the company's Atlantic Branch export department. **Gordon Pope,** formerly with the export department, is now in the metal sales department of the branch. **Alfred A. Podesta** has been placed in charge of sales for lined products in the Atlantic branch.

• **Howard J. Mather** has been named assistant general manager of industrial finishes for the paint division of Pittsburgh Plate Glass Co., Pittsburgh. Mr. Mather has been associated with the company since 1939, serving as an industrial sales representative for that division.

• **Charles E. Robinson** has resigned as vice-president in charge of sales, Sommerfeld Machine Co., Braddock, Pa., to become president of the newly-formed Hercules Pennsylvania, Inc., Pittsburgh.

• **Robert E. Hospes,** who has served as engineer with the Aluminum Seal Co., Inc., since 1945, has been named assistant chief chemist at Alseco's new headquarters in Richmond, Va. Mr. Hospes joined the Aluminum Co. of America in 1942 and was transferred to the company's Aluminum Research Laboratories in 1944.

ROBERT E. MARSHALL, secretary, Worthington Pump & Machinery Corp.

• **Robert E. Marshall,** assistant secretary of the Worthington Pump & Machinery Corp., Harrison, N. J., has been elected secretary of the corporation, succeeding C. Neal Barney, who died. Mr. Marshall has been associated with Worthington since 1947. He has his headquarters in New York.

• **S. F. Thune** has been promoted to sales manager of the midwestern division of National Starch Products Inc., New York, with headquarters in Chicago. Mr. Thune has served for the past three years as sales manager of the Pacific Coast division at San Francisco. He has been with the company since 1934. **Francis R. Loetterle** has been appointed sales manager of the Pacific coast division. He has been associated with the technical service department at both New York and Chicago since joining the company in 1940.

• **L. W. Adams** has been promoted to mechanical goods district manager for the Goodyear Tire & Rubber Co., Pittsburgh. He had formerly served as field representative in Boston. Mr. Adams has been with Goodyear since 1943.

• **John von Rosen** has been promoted to the staff of the vice-president and general manager, Chrysler Corp., Detroit. Mr. von Rosen has been associated with Chrysler since 1932.

HARRY A. FOHL, chief engineer, Lukens Steel Co.

• **Harry A. Fohl** has been appointed chief engineer, **Neils H. Jensen,** assistant chief engineer, and **Malcolm B. Antrim,** superintendent of electrical maintenance, Lukens Steel Co., Coatesville, Pa. Mr. Fohl, who had formerly served as assistant to the chief engineer, succeeds **P. C. Haldeman,** who has retired. Mr. Antrim succeeds **Walter H. Burr,** who has also retired.

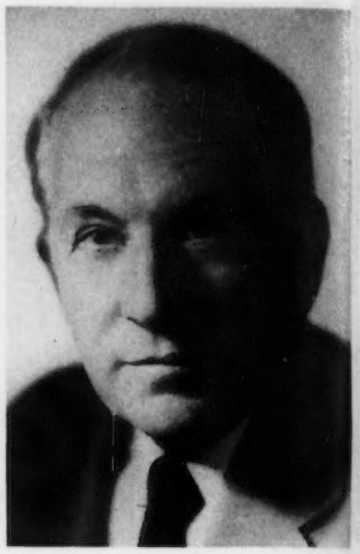
• **Andrew Hood** has been elected secretary of the Hudson Motor Car Co., Detroit, the duties of which position he assumes in addition to those of treasurer of the company, in which post he now serves. Mr. Hood succeeds **C. D. Sterling,** who has resigned because of ill health. Mr. Hood joined the company in 1920 as a cost clerk. Mr. Sterling, who had served as secretary since 1936, joined Hudson in 1916 as a clerk.

• **Robert C. Maentz** has been placed in charge of the aluminum division, Hill-Chase & Co., Philadelphia. Mr. Maentz had formerly been building products manager of the eastern division of Permanente Products Co. in the Cleveland office.

• **William H. Campbell** has been appointed manager of the Albany district of the replacement tire sales division of the B. F. Goodrich Co., Akron, Ohio, succeeding **Frank G. Harrison, Jr.,** who has resigned. Mr. Campbell joined the organization in 1937. Since early in 1948, he has been store supervisor in the Albany district. **Lewis B. McRae** has been named manager of the Cincinnati district of replacement tire sales, succeeding **Mark O. Ward,** who died. Mr. McRae has been acting district manager and had previously served as general supervisor.

• **Henry W. Reis, Jr.** has been appointed to the newly-created position of assistant sales manager of the electric typewriter division of International Business Machines Corp., New York. Mr. Reis had formerly been electric typewriter manager in the Boston office. He joined IBM in Rochester in 1938.

• **Marcel F. DeMuller** has been appointed president of Willys-Overland Export Corp., and president and member of the board of Willys-Overland of Canada, Ltd. Mr. DeMuller has served as vice-president and general manager of the Export corporation and vice-president of the Canadian company for several years. He has been with Willys-Overland for five years. **Delmar G. Roos,** first vice-president of Willys-Overland Motors, has been appointed to the boards of the Export corporation and the Canadian company. **George L. Palmer,** treasurer, has also been made vice-president of Willys-Overland Export.



CHARLES A. FITZ-GERALD, representative, Sloss-Sheffield Steel & Iron Co.

• **Charles A. Fitz-Gerald** has resumed active representation of Sloss-Sheffield Steel & Iron Co., Birmingham, in the St. Louis and Chicago territories.

• **H. W. Milner** has been named sales manager of all gas-burning domestic heating equipment produced by the South Wind division of Stewart-Warner Corp., Indianapolis. Mr. Milner has been with Stewart-Warner since 1948, when the Heating Research Corp., where he had been vice-president in charge of sales, was taken over by Stewart-Warner.

(CONTINUED ON PAGE 132)

OBITUARY...

• **Edgar C. Thomas,** vice-president in charge of eastern sales, Thomas Machine Mfg. Co., Pittsburgh, died May 17.

• **Arthur S. Tuttle,** 84, former chief engineer of the New York City Board of Estimate and Apportionment, died May 22.

• **William R. Reiter,** 42, assistant superintendent, Braeburn Alloy Steel Corp., Braeburn, Pa., died May 21.

• **Frank B. DeLong,** 58, vice-president in charge of sales, Columbia Steel Co., San Francisco, died May 28.

• **Edward S. Walton,** 58, in charge of excess accumulations in flat rolled sales, Youngstown Sheet & Tube Co., Youngstown, died May 17.

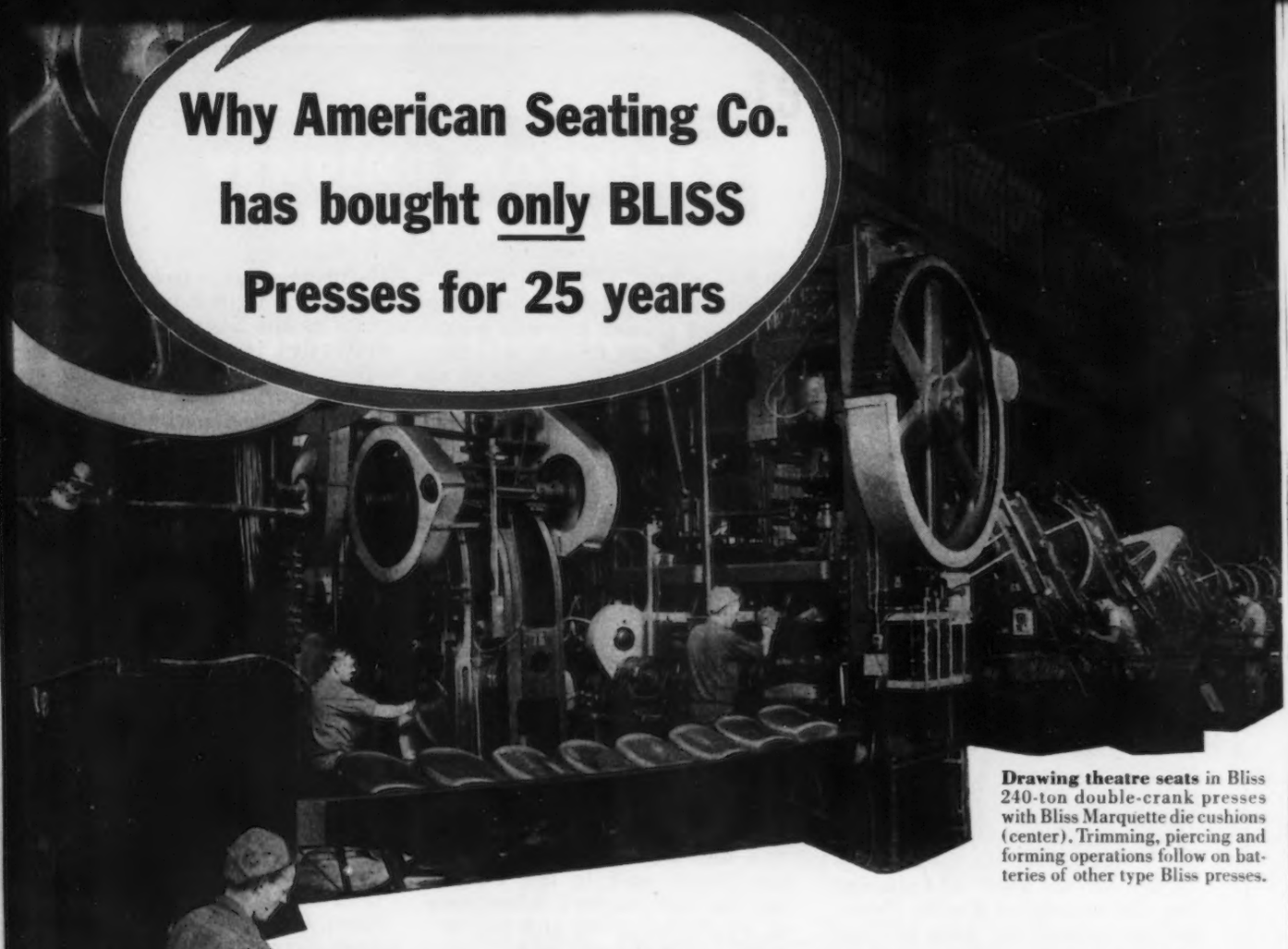
• **Orville B. Ewing,** manager, New Orleans office, Youngstown Sheet & Tube Co., died May 11.

• **Ernest L. Davis,** 69, president, Monmouth Products Co., Cleveland, died May 18.

• **Charles O. Barks,** 75, retired superintendent of city furnaces, Sloss-Sheffield Steel & Iron Co., Birmingham, died May 15.

• **J. Pressley Coleman,** 83, retired consulting engineer, Union Switch & Signal Co., Pittsburgh, died May 23.

Why American Seating Co. has bought only BLISS Presses for 25 years



Drawing theatre seats in Bliss 240-ton double-crank presses with Bliss Marquette die cushions (center). Trimming, piercing and forming operations follow on batteries of other type Bliss presses.

Bodiform theatre seats consist of a variety of different stampings, all produced on Bliss equipment.

"Until 1924, we used many makes of presses, but since that year we have purchased only Bliss for our metal plant."

That's how the works engineer of the American Seating Company of Grand Rapids, Michigan, world's largest manufacturer of public seating, tells the story. Today this plant is 75% Bliss-equipped—63 Bliss-built presses in all, including inclinables, horn presses, arch presses, end-wheel, and straight-side single- and double-crank presses.

"What do we like most about Bliss? Well, I'd say it was that extra margin of dependability—and that includes more than press performance," adds the works engineer, who is responsible for the purchase and operation of all of American Seating's metal-working equipment.

Here's what he means by "more than press performance":

1. Engineering counsel on equipment for new stampings.

2. Prompt assistance on presses "down" for repair.

3. Instruction of press-room personnel.

A Bliss sales engineer will tell you of many similar case histories and help you get the most out of your pressed-metal production. Send for him today. See our Catalogue in SWEETS—or send for Bulletin 35-B.

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BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

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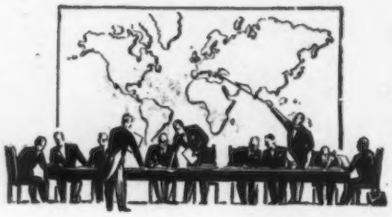
European Letter . . .

• British renunciation of Indian authority outstanding example of successful timing . . . Pandit Nehru's government an efficient civil and military state organization . . . Congress Party leaders aware of dangers of Communism.



LONDON — The last three months have seen striking changes in the views taken by the outside world of India and the Government of Pandit Nehru. Moscow seems to have decided quite recently that a sinister third force is arising in Asia, the strength and stability of which might offset what has been achieved by the Communists in China and Burma. London has watched with growing admiration and relief the moderation and skill with which Indian statesmen have steered through the cross currents of Asian nationalism running from Indonesia to the Middle East. And other Commonwealth capitals have become increasingly aware of Delhi as a center of power, around which some regional organization for the countries of the Indian Ocean might grow. All these important trends of opinion would prove premature, indeed quite unsound, if they were based on false assumptions about the internal strength of India and the political prospects of Pandit Nehru and men like him. How great in fact is India's ability to confront the Communist challenge in Asia, allied as it is to nationalist movements with which it has fundamental sympathies, and the Communist challenge at home, springing as it does from social and economic problems calling for urgent action?

It seems likely that the historian of a later day will regard the date of the British renunciation of authority in India as an outstanding example of successful timing. If it had been delayed longer, bloodshed could hardly have been avoided, and Indo-British amity after departure would then have been virtually unattainable; if, on the other hand, it had been a decade sooner, Congress politicians would have lacked the preliminary experience in responsible government which they obtained, though briefly, in the Provinces, after the elections of 1937, and "Indianization" in the civil service and army would not have reached the point at which the transfer of supreme power could be made without administrative breakdown. As it was, the transition was disorderly and bloody only in the Punjab, and the new regime's inheritance of an efficient civil and military state organization gave independent India an excellent start, for which India's former British rulers are entitled modestly to claim some share of the credit. Even so, all these advantages would quickly have been lost by inept or divided political leadership, and there have been indeed moments when it seemed that communal religious strife and tension between India and Pakistan might bring chaos and collapse. That this has not happened, but that, on the contrary, there has been a remarkable assuagement of the communal issue and a measure of reconciliation with Pakistan, has been due to the wise and coolheaded direction of policy by the leaders of the Congress Party, especially during the last few months.

As the organization which led the political struggle for national independence, the Congress party enjoys an authority to which there is as yet very little organized opposition. This has given to India for the time being something of the character of a single-party state. But Congress has no theoretical doctrine of permanent single-party rule of the Communist or Fascist type, nor even of a temporary tutelage, such as the Kuomintang formerly advocated in China; the new Indian constitution provides for a full parliamentary democracy with opposition parties. The present concentration of power is due partly to the long lead which Congress has in nationwide organiza-

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tion over all rival groups, and partly to its own comprehensiveness which continues to hold together in the ruling party men of widely differing opinions. Congress has no rigid ideological doctrine apart from its nationalism, and resembles a coalition rather than a unitary body. Mr. Jugjiran Ram stands rather to the left of Mr. Aneurin Bevan, while Mr. Vallabhai Patel is to the right of Lord Woolton. Sooner or later, no doubt, there will be a split in Congress over questions of economic policy and a more normal parliamentary system will emerge.

MEANWHILE, however, Congress has been able to maintain its unity on three main points: the secularism of the state, agrarian reform, and the suppression of Communist revolutionary activity. The two first of these are the condition of success in the third, for failure either to cope with religious communalism or to tackle the problems of land tenure would create the condition which Communism requires in order to gain real strength in India.

The question of secularism, as it presents itself in India, is not easily appreciated in this country. When Mr. Nehru says in a public speech that the secular character of the Indian state must be maintained at all costs, almost as if he were bidding defiance to an invading enemy, he may seem to exaggerate the importance of the issue. But the forces working against Mr. Nehru's conception are formidable and the consequences of their ascendancy would be far-reaching. Mr. Nehru holds

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that, even though Pakistan may be a Moslem state, India must not be a Hindu state. India still has a large Moslem minority and numerous Hindu and Sikh refugees from the West Punjab; the domination of militant Hindu-Sikh communalism within India would soon bring fresh communal massacres and acute tension, if not war, with Pakistan. Mr. Nehru and his political friends are determined to keep the authority of the state superior to religious cleavages, and they have dealt severely with the para-military organizations of the religious fanatics, the Hindu Mahasabha and the Sikh Akalis, as well as with the Moslem Razakars.

THE Congress party leaders are also determined to rid India of social customs which have been hitherto bound up with Hinduism, but which they consider incompatible with the development of a modern democratic society. Untouchability has already been made unconstitutional, and the new legal code will prohibit polygamy, give daughters equal rights of inheritance with sons, and permit divorce and intercaste marriages. It would be wrong, however, to infer that Congress is pursuing an antireligious policy. Unlike Communism, it has no materialist ideology antagonistic to religious belief, and it continues to draw much of its strength as a political force from the religious revival of which Mahatma Gandhi was the leader.

Religious communalism is a peculiarly Indian problem. But agrarian reform is of equal concern to all Asiatic countries. The consequences of the failure of the Kuomintang in China to carry out its original program on behalf of the peasants have not passed unnoticed in Delhi. Communism in China has owed a great part of its success to its policy of redivision of the land, and in all such pre-industrial societies of dense population and marginal subsistence, the great masses of landless rural tenants and laborers are a potential revolutionary force which can be exploited by anyone who is able to organize it. In India, legislation for breaking up *zemindari* properties and distributing land to peasant cultivators is being carried through in the provinces, but it has been laid down that fair compensation must be paid to the landlords and in convertible bonds. In the former princely states, too, where the rulers were often landlords with large, mingling public and private revenues in their treasuries, the Indian Government by use of its new powers has carried out drastic fiscal reforms, even though it has left the princes with substantial civil lists. The threat of a more radical social revolution has been sufficient to reconcile most of the Indian landowners to a regime which makes some effort to temper the wind to the shorn lamb. Any policy of redistribution of land with payment of compensation is expensive, and it is on the development of production, especially in industry, that India relies for continued solvency.

In its effort to raise the level of production the Indian Government has been working in close cooperation with the group of industrialists which played so large a part in building up the Congress party. It is the degree of industrial development and of native capitalist organization which distinguishes the economy of India from the stiff feudal condition of China and the foreign-controlled colonial or ex-colonial systems of South-East Asia. In China the Communists claim that they themselves have to bring in the bourgeois-democratic phase of social development, because the Kuomintang is too reactionary to do so, while in South-East Asia it is sufficient to be antiimperialist, but in India Communism is confronted with a vigorous and expanding Indian capitalism supported by a strong, modern state administration.

WITH little prospect of acquiring real political strength either by constitutional means or by open armed revolt, the Communists in India have bent their energies towards disrupting production wherever possible, in the hope that the frustration of the national effort to raise production will cause an economic collapse. They have had some success in penetrating trade unions, particularly those of railway workers, where they have been rivals of the Socialists. The Indian government has recently taken vigorous action against the Communists and has made many arrests, charging the party with plans for causing breakdowns in industry by a campaign of violence and sabotage. Communism cannot be eliminated by police repression alone, but at any rate the boldness with which the Congress leaders have grasped the nettle shows their awareness of the danger and their resolve not to allow the sentimental pro-Sovietism of Congress's revolutionary days to be exploited for Communist undermining of the new national state.

To this domestic attitude corresponds an increasingly clear perception, at least in high official quarters, of India's common interest with other nations resisting Soviet pressure and infiltration. The original intention to stand in a serene neutrality between the warring camps of world politics is still formally maintained, and in any case India is determined not to abandon its full independence in foreign policy; but the dangers looming over Asiatic countries are driving India away from the middle path. If India continues to champion the cause of Asiatic nationalism against European powers which have failed to recognize its basic claims, this does not involve any general hostility to the West and has proved highly displeasing to Moscow, whose antiimperialist thunder has thus been stolen.

INDIA'S strongest foreign links are still with the nations of the Commonwealth, and since the armistice in Kashmir has removed the risk of open war with Pakistan the way is clear for the further development of the cooperation so promisingly initiated at the last Commonwealth Prime Ministers' Conference. Mr. Nehru's latest statement has left no doubt that India cannot go back on the decision of the Constituent Assembly to make India an independent republic; but he has also made clear his wish for the continuation of the Commonwealth tie in one form or another. If as high an order of statesmanship can be applied to the solution of this problem as has been brought to bear on Indian affairs since 1945, an outcome may be expected which will establish a new framework of peace and stability.

"Spoon Handle" WITH A $12,500 PRICE TAG

Photo taken in Southern Illinois coal fields by William Vandivert

Offhand you might suppose that this huge tube is a factory smokestack. But it's really a spare "spoon handle" for a giant shovel used in surface coal mining. This big boom carries a price tag of $12,500—which is a lot of money for a spare part. Yet if one such boom should fail, it would take over eight weeks to build a new one—tying up for the entire period a shovel costing more than $650,000!

Mechanized mining calls for immense capital expenditures. A medium-sized loading machine now costs about $20,000, a 6-ton electric shuttle buggy about $12,000, and some mobile cutting machines cost as much as $28,000, while the building and equipment of a modern preparation plant is a million-dollar project. Some large ones built since the war have represented an outlay of as much as $7,000,000 each!

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Today, almost two-thirds—more than 260,000—of the nation's bituminous coal miners either rent from private landlords or own their own homes, and home ownership among miners generally is on the increase. This is good for families and their companies alike. It gives to the miner the greater satisfaction and security that come with living in a "home of his own," and it frees management and capital for the big job of getting maximum coal production at the lowest possible cost.

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• **"DEAR MR. MOSES:"**—Copies of letters exchanged between UMW chief John L. Lewis and Harry M. Moses, head of H. C. Frick Coke Co., disclose that the two met in Washington for (1) a 45-min lunch and (2) a 2½-hr talk, both on May 21. The fact that "no conclusions were reached in these pleasant personal discussions" led Mr. Lewis to ask negotiations on a new contract. To this Mr. Moses replied that he'd prefer to talk about this after the commercial operators—representing 90 pct of the tonnage—have signed a new contract. He said he would meet Mr. Lewis however, if the latter were adamant on the matter.

• **SLAB PRICE**—Reports that Rotary Electric Steel Co. is selling carbon steel slabs at $52 per net ton in Detroit were neither confirmed nor denied by the company last week but it is believed that this may be a temporary proposition. At current scrap costs it is believed this would be a practical private deal for McLouth Steel Corp. to make with Rotary until the former's slabbing mill is ready to run.

• **FURNACE DOWN**—Last week Republic Steel Corp. shut down its No. 2 blast furnace in Cleveland for an indefinite period. Reduced demand for foundry grades was held responsible for the closing. Unit has a daily capacity of 550 tons. The company said the shutdown will not mean a reduction in the company's operating rate which is about 95 pct of capacity.

• **INLAND AGREES**—Inland Steel Co. has agreed to bargain with the CIO in its plants on all welfare demands. First meeting is scheduled for June 3 in Chicago. Local 1010 held a strike vote meeting last week at which only 100 members out of 9000 attended. National CIO headquarters has implied that the local was off base on the strike vote issue.

• **GALVANIZED CUT**—Reductions in galvanized sheet extras averaging $1.50 per ton were automatically put into effect by Carnegie-Illinois and other sheet producers last week following the zinc price cut.

• **WORKED OUT**—Operations at the Wylam coal mine of the Tennessee Coal, Iron & Railroad Co., Birmingham, will end on or about June 24. The mine has been worked out. The company said loss of production will be offset by its new Concord mine.

• **DETROIT PRICE**—Detroit Steel Corp. cold-rolled strip price reduction reported last week applies only at Detroit. The company's New Haven cold-rolled strip price remains at $4.50 per 100 lb.

• **HAND MILL TROUBLES**—Mahoning Valley Steel Co.'s hot mill department, Niles, Ohio, will reopen June 6 after a 2-week layoff. The layoff affected approximately 500 employees. John P. Hosack, president, said the shutdown was caused by general business conditions and a trend on the part of business to reduce inventory. At New Castle, Pa., Hudson Motor Car Co. will discontinue operating its Valley Mfg. Co. hand mills by mid July. At its peak it employed 600 people. Phoenix-Apollo Steel Co. expects to close its Apollo, Pa., plant, operating hand sheet mills, by July 1.

• **LAYOFF**—Lukens Steel Co. furloughed approximately 150 more workers last week, reducing the force to approximately 5000 employees. Lack of orders, especially for steel plate specialties in its By-Products Steel Co. and Lukenweld divisions, was cited as the reason for the reduction. The new layoffs will bring the total to approximately 425 since Feb. 19, when, the company said, business conditions reversed themselves and started downward.

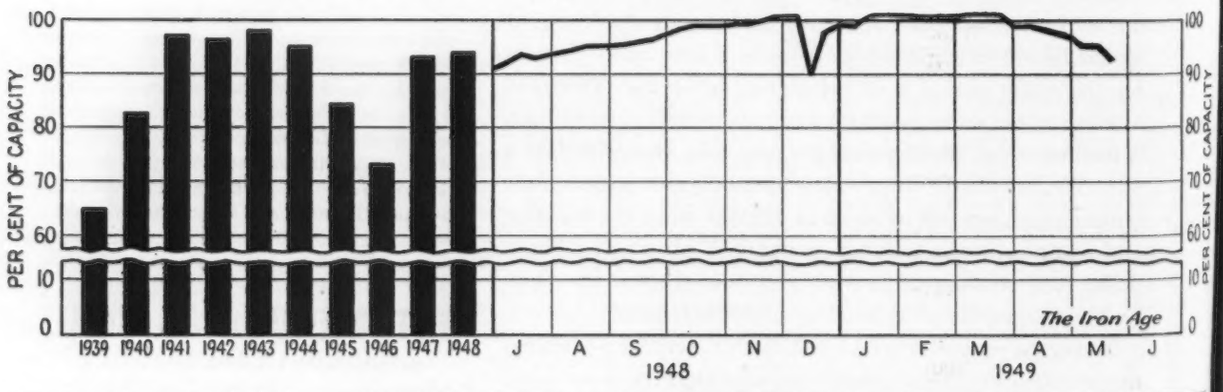
• **ANOTHER**—On May 25 Gary Works of National Tube Co. laid off 500 workers. Prior to the layoff the plant employed 1800 men. Lack of sufficient orders to keep the mill operating at capacity was given as the reason for cutting the working force. Concurrently, South Works plant of Carnegie-Illinois, another U. S. Steel subsidiary, took down the large help wanted signs which they have displayed for years.

• **STAINLESS EXTRAS**—Washington Steel Corp. announced substantial reductions in extra charges on stainless steel sheets, gages 27 through 36, effective May 23. Purchasers, salesmanager John C. Richards said, will save from 11.66 to 26.67 pct on the reduced gage extras. Washington's Sendzimir mill rolls light gage stainless up to 36 in. wide.

• **PIG IRON**—Pig iron production in the first 4 months of this year amounted to 22,078,772 net tons, as compared with 18,661,100 net tons a year ago, according to American Iron & Steel Institute. The April production amounted to 5,479,510 net tons, as against 5,761,872 net tons in March of this year.

• **FIRST BIG STEEL CUT**—Due to lessened demand, Carnegie-Illinois Steel Corp. has taken off five openhearths in its Monongahela Valley (Pittsburgh) district plants, dropping its operating rate there by 6.3 pct to 98.4 pct of rated capacity.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 24	97.0*	99.0	99.5*	94.0	100.0	98.5	94.0	105.0	75.0	88.5	83.0	78.0	85.0	94.0
May 31	92.5	99.0	90.5	92.0	103.0	98.5	94.0	105.0	75.0	92.0	83.0	78.0	85.0	93.0

* Revised

Industrial News Summary

- ***Steel Order Volume Dropping***
- ***Going For Orders Gets Tough***
- ***Scrap Prices Decline Again***

PEOPLE in steel who have been the most optimistic on the production outlook have changed their minds a bit recently. In the past 10 days these steel officials have noted that: (1) Steel order volume is slowing down; (2) backlogs are being pared by cancellations; and (3) there is difficulty getting enough orders on the books for July rolling.

Some smaller steel mills are struggling this week to keep their operations at the two-thirds or three-quarters mark. Orders are not coming to them fast enough to keep output up to economical levels. Other smaller firms are well fixed into June. Large steel firms see their operations at a good level only because the pressure is on to get enough product mix to keep activity at that point. Just how long they'll be successful in this effort to get orders far enough ahead for economical operation remains to be seen.

Much has been said about break-even points in the steel industry. Before the war most plants could make a profit at around 48 pct of capacity operations. It's a different story today. No mill has had any real experience to tell exactly what its break-even point would be today. This is so because: (1) Labor rates are much higher than before the war; (2) material costs are higher; (3) maintenance and repair costs are somewhat different than they were 10 years ago; and (4) new capacity installed in some cases has cost three times as much as in prewar years.

Some firms—the large ones especially—think an operating rate of 75 pct would "hurt." Smaller unit are already below this rate but are in the black—mainly because of lower scrap prices, better productivity of the worker and renewed emphasis on proper use and conservation of raw materials.

Executives of some bigger steel units have said privately that their break-even point might be around 70 pct operations. But they do not know for sure. Two things which make it impossible to tell at this time are: (1) Probable increased costs because of the coal contract coming up and (2) chances that the steel union will win a moderate social security package. These items, plus the higher ore costs this year, have offset to some extent the fall in scrap prices.

THE drop in scrap prices, which has amounted to about $21.25 a gross ton since the first of the year, has not all been gravy for steel firms. Smaller plants which have been able to reduce their inventories fast have benefited. But larger steel firms have not been able to get down to current prices on the material they are using because their high priced stocks were so big. A few large steel firms will still be operating on high priced scrap for many months.

Generally, for each dollar drop in scrap prices, the mill benefits to the tune of 25¢. This is because the average amount of open market scrap used in a ton of steel is one fourth of the total charge in the furnace. The balance is one fourth home scrap and one half pig iron. These percentages vary but generally they average out to those mentioned. When scrap inventories are high it takes some time for the lower priced open market scrap to dictate the price average for the total amount used in the furnace.

Although the ingot rate is off 1½ points this week to 92½ pct of capacity, some are wondering what holds it up in the face of shrinking steel demand. A check by THE IRON AGE shows that the current rate remains high—but is declining slowly but surely each week—because: (1) Big steel companies have greater order backlogs and their rate holds up the average; (2) current production is on orders placed some time ago; (3) semifinished inventories in the steel plants are being built up; (4) steel warehouses belonging to steel producers are being well stocked and (5) steel mills' subsidiary firms making finished steel products are getting bigger and bigger supplies to work with.

DIRECT competition from some of his own customers is fast becoming one of the steel salesman's biggest headaches. From Detroit to Houston and from Philadelphia past Chicago, companies which normally buy and fabricate steel are now trying to sell it. What they have for sale is usually mill run material, sheets and bars, at mill prices. Sometimes there may be a price concession.

The total tonnages involved in these offerings is small in comparison with current mill output. But their effect on the market is often out of all proportion to the tonnages involved. The mere fact that the steel is being offered by big manufacturing firms in a drive to reduce inventories is a potent psychological factor, emphasizing the whole matter of inventory control.

Those who had been looking for a slightly stronger scrap market got another setback this week. At Philadelphia, which has been a bellwether on scrap prices, the price of No. 1 heavy melting is off $1.00 a ton. This drop has taken THE IRON AGE steel scrap composite down 33½¢ a gross ton to $21.75 a gross ton—the low point for the year. In many cases scrap prices are lower than they were under OPA, when allowable freight at that time is considered.

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Steelmakers See Good Export Prospects for Balance of Year

But Rising Export Trend Can't Be Counted on to Maintain A High Steel Rate

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BY BILL PACKARD
Ass't News-Markets Editor

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New York

• • • **Iron and steel** exports can't be depended upon to hold steel operations at a high rate this year. The export outlook is good. But the tonnage involved just isn't big enough to support a high ingot rate if shrinking business forces large domestic customers to leave steel companies high and dry in the third or fourth quarter.

Those in the iron and steel export business look for a good year, probably much better than last. But even the optimists don't expect it to top 1947—at least on a total tonnage or dollar basis. Last year's tonnage could easily have been the highest of any peacetime year had it not been for rigid controls. As it was the 4,680,000 tons exported amounted to only 7.1 pct of total steel shipments, according to American Iron & Steel Institute figures. This was a decrease of 2,196,000 tons, or 35 pct, from 1947, when exports equaled 10.9 pct of total shipments.

So far this year no significant spurt is indicated by figures. Exports during March, latest month for which figures are available, were 440,703 net tons. The March figure is substantially above February, but only slightly above January. It is at an annual rate of 5.3 million tons. Exports for the entire first quarter were at an annual rate of slightly less than 5 million tons.

Actually total exports this year will be well above 5 million tons. For one thing, figures so far available don't yet reflect the important easing of export controls. Nor do they reflect the confidence of those in the trade that the second half of this year will top the first—at least in exports.

The scramble for the export market is already well under way. With the return of the normal buyers' market at home, steel firms are aware that exports can mean the difference between profit and loss. They have in the past. Easing of export controls has opened the foreign-market door to steel firms which were already worried about business during the latter half of the year.

One steel leader has already gone on record that his company "is out to recapture its export market." Another company is known to have recently booked a substantial volume of export business. Other companies are working just as hard. Some are even offering discounts from their mill prices on some products in the form of export commissions.

But the export market isn't as lush as some people think. Steel people know that their products have to be sold in competition, not only with each other, but also with the rapidly reviving output of European producers. The competition is formidable, the selling job difficult.

Selling outside the framework of the Marshall Plan is aggra-

INVENTORY: *Although the outlook for exports has taken a somewhat brighter turn, steel people know that the potential tonnage for this market isn't big enough to support high operations if domestic demand slips badly. Domestic business is still the backbone of operations. Photo shows shipment of J & L electric-weld tubing arriving at Houde Engineering Div., Buffalo.*

vated by dollar shortages and unrealistic currency exchanges. Realistic demand must be measured by ability to pay. In addition to making selling harder, this definitely limits the amount which can be sold.

The recovery of iron and steel production in Europe has been spectacular. Last year all but one European country exceeded 1948 production goals. Blast furnace output in Europe was 37 pct greater and crude steel production 29 pct greater than in 1947. The impact of this remarkably improved production is accentuated by the real need of these nations to increase their exports. They are tirelessly searching the world for markets.

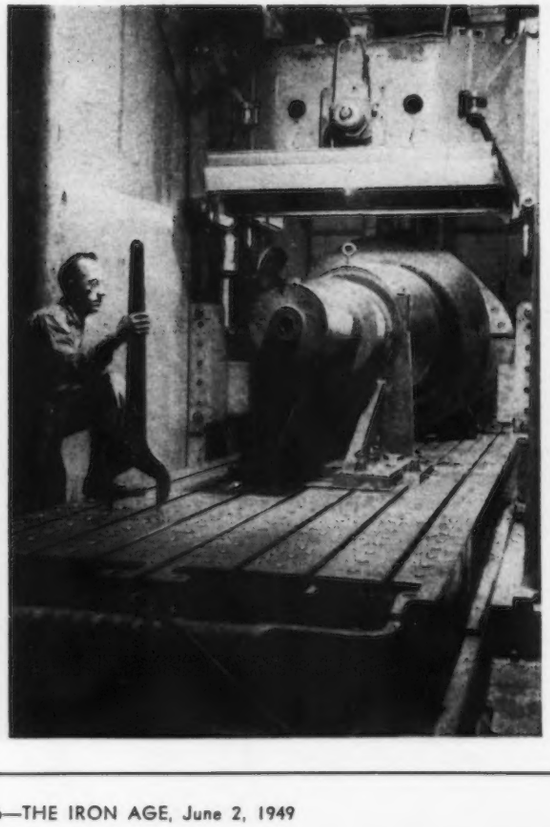
Because of this there has been some fear that our export markets might be lost to European producers. Sales by foreign producers are cited, not only in Europe, but also in South America, Canada, and even in the U. S. Domestic producers say they aren't surprised by the foreign competition. They say these nations exported steel products before the war and they can naturally be expected to do so again.

Moreover, those in the export business realize more fully than most that foreign trade isn't a one way street. If we try to make it so we might some day find ourselves at its end holding nothing more useful than a beautiful golden balloon. Goods can only be paid for with goods—or credit. And credit can only be repaid by selling goods. This may be a vicious circle. But it's also the exporter's ABC of foreign trade.

Domestic producers also point out that European nations don't generally specialize in export of the same type of tonnage products as the U. S. They say that such products as reinforcing bars and small specialized structural shapes do not compete with plate and flat-rolled products produced on continuous mills.

Probably the biggest reason domestic producers view the competitive export market with confidence is *quality*. They are convinced that their products are superior to those produced abroad. Their sales tactics reflect that conviction. Although they emphasize quality and service, they expect to make a profit on all products sold. They aren't prepared to engage in price cutting to get foreign orders. They declare the practice of "dumping" will not be revived.

The declining ingot rate makes the role of exports more important than ever. They can help steel firms keep their books in the black. But competition is here, too. And relatively bright prospects for this market do not insure high operations if domestic demand shrinks later in the year.



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ROTOR CORE: *A new planer type miller is readied for its first slotting operation in GE's new turbine plant. Two 75 hp vertical spindles and two 60 hp side heads provide the drive. A 130,000 lb steel rotor core rests on the 40-ft table. Infinite control is achieved on the miller by the use of electronic controls. Rate of feed may be varied from ¼ to 60 in.*

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Lifts Export Quota Restrictions From 22 Iron, Steel Items

Washington

• • • **In line** with the easing of the steel supply, the Office of International Trade recently lifted export quota restrictions from an additional 22 iron and steel mill products.

This latest move leaves only five iron and steel items subject to quota limits. They are: galvanized sheet, electrical sheet (transformer grade), scrap, tin plate and terneplate.

In announcing the order, Commerce Secretary Charles Sawyer emphasized that while quota limits have been removed, licenses are still required for exporting the items.

The complete list of products from which quantitative quotas have been removed for the second and third quarters is as follows:

Schedule B Number	Item
601800	Tube rounds
602200	Concrete reinforcing bars
602100-300	Iron and steel bars, 1 in and under
603120-80	Carbon and alloy plate
603200	Skelp
603500-600 except 603595	Black sheet
604300	Unlined atorage tanks
604750	Penstock
684790	Fabricated plate
605100	Rails, 60 lb and over
606250	Seamless pipe, casing
606290	Seamless pipe, line
606350	Welded pipe, casing
606390	Welded pipe, line
606400	Seamless black pipe
607000	Welded black pipe
607200	Steel pipe, galvanized
609200-500	Nails
610515-25-35	Railway axles, wheels and sets
606705-98	Cast iron pressure pipe
600700	Pig iron
608300	Barbed wire

AISI In Surprise Move Awards Ben Fairless Its Highest Honor

New York

• • • Public acclaim and recognition comes to some people after they have passed on. To others it comes as a well deserved tribute after they have finished their industrial career. Rarely does it come to men in the midst of their accomplishments.

Last week, in a surprise move, the directors of the American Iron & Steel Institute publicly recognized in Ben Fairless, U. S. Steel head, what his friends and close associates have known for a long time—his unstinted and straight line service to the steel industry.

Eugene Grace, Bethlehem's board chairman, in presenting the Gary Medal to Mr. Fairless—who was alternately surprised, embarrassed and stunned—said "your services to the industry are just so outstanding that there's nothing to compare with them."

Mr. Grace—in a warm emotional way, unusual for him, said this of Ben Fairless: "You are constantly on the spot fighting for our industry. You are of necessity on the spot because you are president of the biggest steel company in the world. You are always good tempered and give good service in public controversy and you are never stampeded."

At times almost overcome with emotion, Mr. Fairless in accepting the award—only four people in the industry knew in advance that it was to be given—made a firm commitment when he said "I pledge to you that I will try to repay the confidence, trust and recognition you have given me."

Ben Fairless

Submits Plans For Future Underground Mine Development

Washington

• • • Plans for future underground mine development should be coordinated with the government and subsidized with an eye to subsequent conversion to factory sites. Moreover, the work of converting existing abandoned pits into shelters and factories should begin immediately.

These and other conclusions and recommendations directly affecting domestic mining and general industry are contained in a semiofficial report recently submitted to the White House. It was prepared by Major John D. Morgan, Jr., an Army engineer and a National Security Resources Board expert on critical and strategic materials.

Heretofore, the NSRB and the Munitions Board have offered two alternatives for survival of industry in the event of attack by an enemy nation. One is the dispersal of industrial plants and the other is removal of vital plants and fctories to underground sites.

Although the nation's natural caverns of any size have been surveyed, charted and listed, no information is available as to the findings. However, an official Army Map Service has this to say:

"Known caves are too few in number to provide sufficient shelter for machines, goods and people. The number suitable for storage is further reduced by inaccessibility and the rough terrain of their interiors."

Moreover, according to the same source, caves would be difficult to convert. While cave passages in general consist of long tunnels and chambers, often on different levels, the passages are narrow, floors uneven, interiors damp with little ventilation, and many streams are encountered. Moreover, because nature has already carved the passages from the most easily yielding rock, the problem of safe shoring would be greater than in man-made pits.

"The United States must plan and construct its underground facilities before the start of another war," it goes on to state, "or there will never be enough men and machinery available to do the job. . . . In building surface plants, thousands of men can be employed on all corners at the same time. But an underground plant requires excavation as in ordinary mining."

Because time is the chief element in creating defense, it is suggested that the government begin now in helping to plan new mine workings and the further development of operating mines. More specifically, it says:

"The most logical plan of action would call for the government to subsidize specific mining operations in satisfactory locations—the mining company to plan its workings with the view in mind that they would later be used to house important installations.

L. Gerald Firth Resigns

McKeesport, Pa.

• • • L. Gerald Firth has resigned the presidency of Firth Sterling Steel and Carbide Corp. He had held the post of president and general manager since 1933, having succeeded his father who founded the company in 1896.

Mr. Firth will continue as a member of the board and director of research and development, a field of service to the metalworking industry in which he has figured prominently. In 1928 he pioneered in the development of cemented carbides.

J. W. Kinnear, Jr., formerly executive vice-president, succeeds Mr. Firth as president.

Industrial Briefs . . .

• DIAMOND JUBILEE—The Colorado School of Mines has announced a program for the 3-day commemoration of their seventy-fifth anniversary to be held on Sept. 29 to Oct. 1 at Golden, Colo.

• PR HEAD—Marshall A. Shapiro, California Metals Co., Oakland, Calif., a former vice-president of the Institute of Scrap Iron & Steel, Inc., has been appointed chairman of the public relations committee. S. Samuel Kasden, H. Kasden & Sons Inc., New Haven, Conn., a former director of the institute, has been named vice-chairman.

• DIRECTOR WALKER — A. E. Walker, chairman and president, National Supply Co., Pittsburgh, was elected a director of the American Iron & Steel Institute. All other officers and directors were re-elected.

• TECH LEADERS — Dr. J. E. Shepherd, engineering director for electron tubes at Sperry Gyroscope Co., has been named president of the Technical Societies Council of New York, Inc. Other officers elected are: vice-president, Dr. Robert Calvert, chemical patent attorney of New York; secretary, Joseph J. Preisler, material standards engineer of Sperry Gyroscope Co.; and treasurer, W. H. Rivers, staff engineer of Eastman Kodak Co.

• STANLEY GROWS—The Stanley Works at New Britain, Conn., has let a contract to the Turner Construction Co. for an addition to its cold strip rolling mill. Work has started and completion is scheduled for the end of September.

• NACE ELECTS — Philip H. Smith, director of research and development at John Nooter Boiler Works Co., has been elected chairman of the St. Louis Chapter of the National Assn. of Corrosion Engineers. Frank L. Whitney, Jr., corrosion technologist at Monsanto Chemical Co., was named vice-chairman, and E. L. Rice, industrial engineer at National Lead Co., Titanium Div., secretary-treasurer.

• GOOD BUY — American Furnace & Foundry Co., Milan, Mich., has announced the purchase of the domestic furnace division of H. C. Williams, Inc., Detroit, together with all manufacturing and sales rights to newly-designed interchangeable gas and oil winter air conditioners.

• LUERSSEN WINS—George V. Luerssen, chief metallurgist for the Carpenter Steel Co., Reading, Pa., was presented with the first annual David Ford McFarland Award by the Penn State Chapter of the American Society for Metals.

• SPREADING OUT—Peters Stamping Co., Perrysburg, Ohio, has announced a further program of expansion of their plant and equipment, bringing total expenditures for increased facilities since January, 1948, to approximately $500,000. The plant capacity for stampings and assemblies will be increased to twice the capacity early last year.

• GOING WEST — Hydraulic Equipment Co., Cleveland, has announced an expansion of its sales organization and is setting up a West Coast sales office. C. F. Rayment, sales manager, will establish headquarters at Oakland, Calif., while the new sales office is being set up.

• CHANGE OF ADDRESS—Cutler-Hammer, Inc., of Milwaukee has announced a change of address for its Boston district sales office to 784 Commonwealth Ave.

France Receives ECA Authorization for Our Equipment, Materials

Washington

• • • **Procurement authorizations** for more than $12 million worth of American industrial equipment and materials for France and her possessions were approved last week by the Economic Cooperation Administration.

Most of the material will be scheduled for third quarter delivery except a portion of aviation materials which will be shipped during the second 1950 quarter. Included among the approvals were:

Iron and steel mill products and materials, $3,565,000; construction and mining, $2,962,000; aircraft, parts, ground and handling equipment, $2,860,000 ($355,000 for planes); engines, turbines, generators, etc., $967,000; rail transportation equipment, motor vehicles and parts, $873,000; machine tools, $565,000; nonferrous metals, $350,000; and metalworking tools, $200,000.

Also approved were proposed purchases of $1 million worth of construction and mining equipment for the Bi-zone, and $350,000 worth of steel mill products and materials by Denmark.

Closes Conversion Plant

New Castle, Pa.

• • • **Bossert Co.,** a subsidiary of the Timken-Detroit Axle Co., will take over operation of the Shenango tin mill here soon. Bossert makes heavy machinery. Valley Mfg. Co., a subsidiary of Hudson Motor Car Co., which has occupied a portion of the plant since its sale to Bossert was announced Dec. 31, 1948, will suspend operations within the next few weeks, according to R. W. Jackson, president.

He said an increasing supply of steel has brought an end to Valley's operations here, and production will end when the present steel inventory has been processed. About 475 employees will be affected.

Mr. Jackson said a mill such as Valley has in New Castle, which converts semifinished steel, no longer can compete with more fully integrated plants.

Scrap Market Reflects Weak Optimism on Business Conditions

Pittsburgh

• • • **Government approval** of scrap exports and its holdup on imports have injected a weak shot of optimism into some scrap sellers but won't cure the patient. The shots are too small and the serum too weak to overcome the effects of oversupply. The patient had been getting so much that it was coming out his ears. He has absorbed a little but is still choking on it.

Five things might normally tend to stiffen scrap prices: (1) Heavy mill buying, (2) substantial exports, (3) fewer imports, (4) a coal strike, and (5) refusal to sell. How strong are these bullish factors?

Many people would like to believe that the scrap market, usually an accurate barometer of future business conditions, is not behaving normally now. These people are wishful thinkers. Steel operations are headed for lower ground later this year—barring a radical change in international affairs. The only question is how low are they going?

Steel people are not in agreement on this point. But generally they have enough material in stock to coast along until they can see where steel melting operations are headed. So whether steel ingot production slips just a few more points or falls fast they need not buy for the next few months. They won't buy in quantity on the open market until they know the answer. And the longer they stay out of the market the more prices will sag.

Scrap exports will help to cut supply somewhat but even if 40,000 short tons are exported in each quarter the total would be only 4 pct of the industry's current inventory of purchased scrap. Imports have been a much bigger factor in price weakness and there is no doubt that the arrival of more than 500,000 tons of German scrap between July 1948 and January 1949 helped break prices.

Under a recently announced Government policy, no scrap allocations will be sought in Germany for the third quarter but material under contract will move for a few months until those contracts are filled.

Adequate Scrap Supplies With Declining Steel Operations Make Outlook Bearish

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BY GEORGE F. SULLIVAN
Pittsburgh Regional Editor

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It must be recalled that the above 500,000 tons were imported at a time when very little scrap could be bought on the open market because most material was earmarked for return to the steel mills. Today virtually all the scrap generated is available on the open market.

Were it not for the way some big steel companies still buy customer scrap and occasionally step in to stabilize a market there would be more tonnage up for bids and prices would be lower. So, without even considering potential steelmaking operations, there have been such radical changes in the market that a complete halt in imports would hardly overbalance the increased supply of material now on the open market for bidding.

TEMPERATURE CONTROL: *Constant checks of temperatures are made in different sections of the coal pile maintained by The B. F. Goodrich Co., for its plants in Akron, Ohio. Coal in the pile is leveled about 10 ft above the ground and rolled tightly to keep circulation at a minimum. Any temperature above 150° F. is considered dangerous and steps are taken to prevent spontaneous combustion.*

If there is a coal strike this year it is unlikely to strengthen scrap prices. Big steel mills are laying down great piles of coal. Some are stockpiling coke. Their blast furnaces are in better shape than ever. With good scrap stocks and plenty of hot metal there will be no recourse to heavy scrap charges.

Refusal to sell will tend to bolster scrap prices but current quotations are too high to invite dealer stockpiling. Buying for investment won't begin until the good grades of scrap are $4.00 to $5.00 less than they are now. And despite this, industrial scrap will still come onto the market though its volume will decline with any dip in business activity.

While the bullish factors look weak the bearish tendencies are strong. A lot of steel mills and foundries are still working off inventories. Though there is no prospect of big imports to upset the market later this year there is more pressure on prices from people willing to sell at any price. It doesn't come from the outlying districts where collecting machinery has practically dried up but the area within a 150-mile radius of Chicago, for instance, still generates at least 300,000 tons of scrap a month—and that is more than the mills want to buy. Even a scrap-minus area like Pittsburgh now has trouble absorbing the scrap generated by the district's fabricators. A steel strike would defer demand and be a further blow at scrap prices.

Part of the present oversupply of scrap was caused by the open winter. Mills bought as usual last winter but the harsh weather never came. So instead of getting less than half what they ordered they got every bit of it. They took in customer scrap until it overflowed their yards. If steelmaking operations were held near present rates for the rest of the year this temporary oversupply would correct itself. If.

British Productivity Team to Study Our Forging Practices

Washington

• • • **A British** productivity team will arrive in New York City in mid-June to begin a month's study of American forging methods. The 16-man team, which will include workers, technicians and supervisors from Great Britain's drop forging industry, is scheduled to leave England June 10 on the SS America.

The team's visit to this country is the third sponsored by the Anglo-American Council on Productivity in cooperation with ECA's Technical Assistance Div.

Details concerning the itinerary for the drop forgers' team have not yet been completed. Plans are being made, however, for the group to visit several United States plants. Arrangements for the team's visit are being made by the New York office of ECA's Technical Assistance Arrangements Branch with the cooperation of Ray Seabury, secretary-treasurer, Drop Forging Assn.; Victor Reuther, director of education, United Auto Workers, CIO; John Pelkofer, president, International Brotherhood of Blacksmiths, Drop Forgers & Helpers, AFL; and Harvey W. Brown, president, International Assn. of Machinists.

The drop forging industry in Great Britain comprises about 200 firms employing approximately 20,000 workers. It produces about 300,000 tons of steel forgings each year for use in the British automobile, aircraft, electrical, marine engineering and farm equipment industries.

Although the British industry includes production of forgings in aluminum, magnesium, copper and nickel alloys as well as steel, the team will concentrate its attention on American techniques in steel forgings. Plans to receive another team composed of experts in the other fields are being discussed.

Changes Conservation Orders for Tin Products

Washington

• • • **The Commerce Dept.** last week amended its tin conservation orders, M-43 and M-81, to permit wider use of tin for a number of products. The changes authorize the use of heavier tin coatings for cans; increased use of tin in certain solders; and more tin for certain manufacturing operations. The amendments will become effective on June 30.

Additional quantities of tin will be made available to industry during the second half of this year to cover the wider uses.

However, the Second Decontrol Act of 1947, as amended by Public Law 606, 80th Congress, which is the statutory basis for orders M-43 and M-81, expires on June 30, 1949, and the proposed changes are predicated on an extension of that law. If the law is not extended, all controls will expire.

Awarded AEC Contract

Washington

• • • **Contract for drilling** a 16-in. fresh water test well on the Atomic Energy Commission grounds at Arco, Idaho, has been awarded A. J. Schoonover & Son, Burley, Idaho, the lowest of six bidders. Water is expected to be struck at 500 ft.

Armco's East Works Set 26-Month Safety Record Which Is Still Going

Middletown, Ohio

• • • **A new safety record** has been made, and is still growing, at the East Works plant of Armco Steel Corp.

L. F. Reinartz, assistant vice-president, Armco, and manager of the Middletown division, announced May 17 that at midnight the 4600 employees of the East Works plant worked 87 consecutive days without an accident that caused anyone to lose work.

"We have not had an accident since Feb. 16," he said. "Since that time we have worked a total of 2,292,800 safe hours which betters our old record of 2,280,000 hr, established in March 1947."

To signal each safe day, the plant's whistle is sounded at 9 a. m. It began blowing two blasts after the new record was made May 17. After passing the 3-million mark, it will begin sounding three blasts, Mr. Reinartz said.

The plant's accident frequency rating (number of accidents per million man-hr) is 1.27 so far in 1949. During 1948 the plant had a frequency rating of 2.54, second best in its history. The current rating places East Works in the lead in Armco's annual competition for the Iron Man safety trophy. Average frequency rate for all industry last year was 13.2; for the steel industry, 6.08.

Ships First Stampings

Youngstown

• • • **Briggs Manufacturing** Co.'s new Youngstown plant shipped its first steel stampings recently to Briggs' Detroit auto body assembly plants, according to W. T. Hanlon, plant manager. The plant recently put into operation its second press and other presses and equipment are being installed as rapidly as possible. Mr. Hanlon estimated the plant eventually will use 10,000 tons of steel monthly and employ more than 1000 workers.

Briggs bought the Carnegie-Illinois Steel Corp.'s old Upper Union mill, converting it into a steel stamping plant for auto body parts as a result of the abandonment of the basing point system in selling steel.

Coming Events

June 2- 4	**Electric Metal Makers Guild,** annual meeting, Chicago.
June 5-10	**Society of Automotive Engineers,** summer meeting, French Lick, Ind.
June 12-16	**Materials Handling Exposition,** Chicago.
June 16-17	**Malleable Founders Society,** annual meeting, Hot Springs, Va.
June 27-30	**American Electroplaters Society,** annual meeting, Milwaukee.
June 27-July 1	**American Society for Testing Materials,** annual meeting, Atlantic City, N. J.
July 11-16	**Concrete Reinforcing Steel Institute,** annual meeting, White Sulphur Springs, W. Va.
Sept. 14-16	**Porcelain Enamel Institute,** annual forum, Columbus, Ohio.

Competition Returns to Construction With Wide Spread Between Bidders

Chicago

• • • **A measure** of exactly how keen competition has become in the construction field was demonstrated here a few weeks ago. On May 6 the state of Illinois opened bids on the first major highway lettings since last December. The price cutting which took place was a pleasant surprise to state officials but to some fabricators it spelled murder.

Never since the prewar days has there appeared the difference in prices that showed up this month. The two jobs cited here are typical of what happened.

Both jobs were fabricated bridge sections. One was located in White County, the other in Montgomery County. One job amounted to about 175 tons of structurals and the other 220 net tons.

In one case the low bid was 7.98¢ per lb. The second low was 8.79¢ and the high was 10¢. In the other case the low bid was 8.95¢ per lb, second low 10.6¢ and the high 12.45¢. These prices are delivered to site. Awards have not yet been made to the low bidder, Milwaukee Bridge & Iron Co. in both cases, but it is expected that this company will receive the awards. On a ton basis, the spread between low and second bidder amounts to $16.20 a ton in one case, and on the other the spread is $33.00 a ton.

Other bidders represented a cross section of most of the major fabricators in this area. Included were American Bridge, Bethlehem Steel, J. T. Ryerson & Sons, Midland Structural Steel, and others. One official of one of these companies expressed the opinion to THE IRON AGE that the low prices appeared completely unrealistic and he doubted if the low bidder could end up in the black on these jobs.

Regardless, it now appears that the period of rough and tough competition has returned to the structural fabricators in this area. Price cutting is but one phase, construction men here believe, however, they admit it's an unpleasant phase of the business and they have no choice but to face it. Many have expected this practice to return for some time, but fabricating men present at the bid opening told this reporter that it arrived with an unexpected suddenness.

ECA Signs Industrial Guaranty Contract

Washington

• • • **The Economic** Cooperation Administration has announced the signing of an industrial guaranty contract with the Metallizing Engineering Co., Inc., Long Island City, N. Y., which plans a $45,000 investment in the United Kingdom.

The company is a manufacturer and supplier of equipment and materials for metal spraying in the repair and salvage of industrial machinery. It will soon start production and distribution operations with a British associate at Chobham in southern England.

Acts as Consultant For Australian Strip Mills

Youngstown

• • • **United Engineering** & Foundry Co. will help build some hot and cold strip mills in Australia, it was announced here. United has been engaged as consultant for building facilities at Port Kembla, Australia, for the Australian Iron & Steel Co., Ltd. The project, it is understood, will involve several million dollars. Much of the mill equipment will be produced by the Broken Hill Proprietary Co., Ltd., of Melbourne, Australia. United will furnish the drawings.

United will make such units as drive mill parts, slab shear and hot and cold mill housings. The hot mill facilities, rated at 2000 fpm, are scheduled to be in operation in 1951. Cold reduction facilities will be installed after the hot mill is in operation.

Appoints Research Fellow

Pittsburgh

• • • **Edward Mackasek,** managing director of the Porcelain Enamel Institute, has announced the appointment of George Warren as PEI research fellow at the National Bureau of Standards, Washington.

As holder of the PEI research fellowship, Mr. Warren will work for fuller development of test methods and testing equipment for the evaluation of the physical properties of porcelain enamel.

AMERICAN IRON AND STEEL INSTITUTE
350 Fifth Avenue, New York 1, N. Y.

Blast Furnace Capacity and Production—Net Tons

April - 1949
Month

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total			
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Percent of capacity	
									Current month	Year to date
Distribution by Districts:										
Eastern	12	13,353,580	1,051,860	x4,244,845	23,539	118,780	1,075,399	x4,363,625	97.9	99.3
Pittsburgh-Youngstown	17	26,625,920	2,102,879	8,408,648	20,898	79,804	2,123,777	8,488,452	96.9	96.9
Cleveland-Detroit	6	6,984,600	563,438	2,298,202	-	-	563,438	2,298,202	98.0	100.0
Chicago	7	15,655,390	1,141,804	4,601,588	-	-	1,141,804	4,601,588	88.6	89.4
Southern	9	5,010,060	403,098	1,632,363	6,783	27,877	409,881	1,660,240	99.4	100.7
Western	4	2,912,300	216,431	893,126	-	-	216,431	893,126	90.3	93.2
Total	37	70,541,850	5,479,510	x22,078,772	51,220	226,461	5,530,730	x22,305,233	95.3	96.1

Eastern Pig Iron Producers Piling More Iron Now Than They Are Shipping

Philadelphia

• • • **Pig iron producers** are doing more piling of iron in the eastern market than they are selling at this time. Foundries are placing occasional small orders, but these plums are generally reserved for the visits of salesmen. Producers' representatives have begun to scour the hinterlands for new business.

Several producers catering to the eastern market report that they have not yet begun to pile iron, where steel furnace requirements are still high enough to take up the slack. Producers and consumers are benefiting by the opportunity to pile iron because of the possibility of shipments of a wide range of analyses from stock. One eastern producer offers a range of silicon content from 0.59 to 3.25 pct. Producers do not, however, intend to go on piling heavily at current prices. Market sources report that furnaces will be shutdown when reasonable inventories have been accumulated.

Pressure by consumers for price reductions is being felt in some quarters. But producers are quite skeptical about the value of reductions in bringing out business of any important tonnage. Order backlogs of pipe foundries are drying up. Soil pipe and jobbing foundry business has been inactive for months. Consumers still have good inventories on hand of domestic and high priced foreign iron, and there is no need for them to add to inventories now that the market has softened.

Southern iron is being offered to this market on a tonnage basis for the first time since the war. Recently the price of Birmingham iron was reduced by $4.00 a ton in order to permit its entry into the northern market on a competitive basis. Pipe foundries favor the use of this iron because of its high phosphorus and low manganese contents.

Southern iron can be brought into this market by a combination barge and rail rate for dockside delivery at a lower price with present differentials than northern iron offered here. The combination rate from Birmingham to Burlington and Florence, N. J., is $8.91. This is made up of a $6.91 rail rate from Birmingham to Norfolk, Va., a special rate set up before the war to permit shipment for export; plus $1.75 for barging from Norfolk. Minimum handling charges of 25¢ a ton are included in the total rate. This is $1.52 lower than the delivered price of the nearest producer.

Buffalo producers are also canvassing the prospect of lower barge and combination rates into the eastern market. The rate for motor barge shipments from Buffalo, through the Erie Canal, out into open water and up the Chesapeake and Delaware to Burlington and Florence is only $3.91. Right now motor barges are not obtainable. The combination barge and rail rate from Buffalo to Philadelphia, transshipping from barge to rail at Beacon, N. Y., is $6.89. The all-rail rate to Philadelphia is $9.18.

Southern and Buffalo producers are also able to penetrate deep into New England in competition with mystic iron at current prices.

But so far, the state of the market has prevented any producer from putting into effect these moves toward lower transportation costs for pig iron.

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SUPPORT: *Structural iron workers of U. S. Steel's American Bridge Co. swing into position a grillage, or footing, for the United Nations Secretariat Bldg. in New York. Forty-four of these footings will support as many columns extending from basement to roof of the 39 - story structure. It will be the first and tallest building to rise on the United Nations Headquarters site.*

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Conducts Work Clinic

Detroit

• • • **Prof. R. M. Barnes,** Dept. of Industrial Engineering, State University of Iowa, will conduct the 1949 Work Measurement Clinic at the Rackham Bldg. June 16 and 17.

Provocative subject of the 2-day meeting will be, "What Is a Fair Day's Work?"

A large group of Detroit time study and methods men, foremen, superintendents, industrial engineers, and plant managers are expected to attend the conference.

Reservations can be made through R. D. McLandress, 15-241 General Motors Bldg., Detroit 2. The program is being sponsored by the Detroit Chapter, Society for the Advancement of Management.

Ford Workers Return; Agree to Arbitration

Detroit

• • • **Ford Motor Co.** workers started to return to work early this week. Some 16,000 men returned to the Rouge plant and another 1000 to the Lincoln-Mercury plant. It was estimated that it would be 2 weeks before all the 106,000 men idled throughout the nation would be back at work.

Terms of the agreement call for representatives of the company and CIO-United Automobile Workers to select an arbitrator to determine whether or not there has been a speed up in operations at the "B" plant at River Rouge. If no arbitrator is found to be mutually acceptable to representatives of both parties by June 2, company and union will each select a representative to meet as an arbitration board including Dr. Harry Shulman, umpire. Decision of the board will be binding on union and management.

While the disputants are discussing arbitration of the speed up issue, they will be preparing to begin negotiations on a new contract.

U.S. Buys for Stockpile

Washington

• • • **Purchases** from the United Kingdom amounting to $2.5 million worth of sisal, sperm oil and platinum for the United States national stockpile have been announced by the Economic Cooperation Administration.

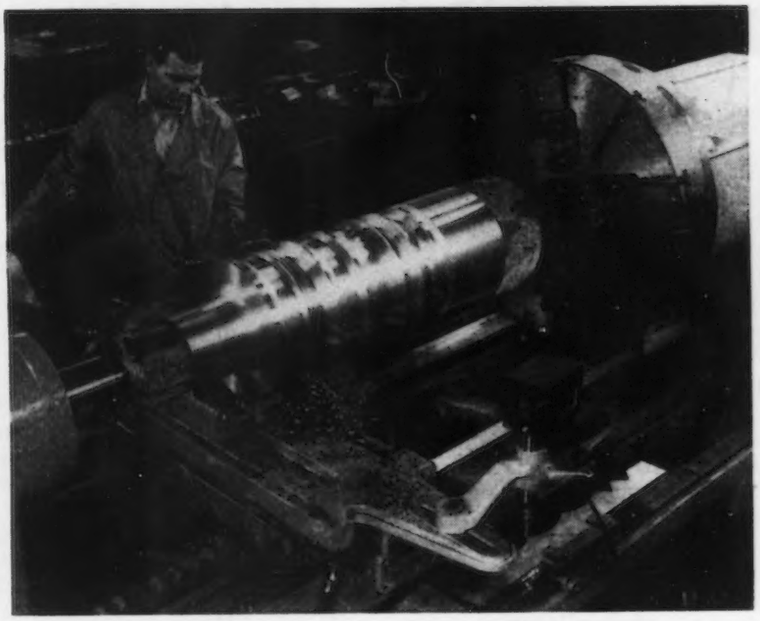
The three commodities were bought for 640,000 pounds sterling, taken from counterpart funds set up by the United Kingdom to match U. S. dollar grants under the European Recovery Program.

Screening Specifications

Washington

• • • **No wire screening** coarser than 16 x 16 (or 18 x 14) and in 0.011 in. minimum wire size is purchased by federal agencies, according to the Federal Specifications Board.

Complete specifications for mesh, wire size and types of metal are to be found in Document CS 138-47, obtainable from the Government Printing Office, Washington 25, D. C., for 5¢ per copy.



Tracer Control Simplifies Roll Turning

Sidney, Ohio

• • • **Completion of the first** successful tracer-controlled engine lathe to be designed expressly for turning steel mill rolls combines improvements in carbide tools with further refinements in Monarch-Keller electrical contouring controls. The machine, in recent tests, demonstrated it could cut by two-thirds or more the present machining time on even the toughest chilled cast iron rolls. So substantial is this saving that for many mills it is estimated the new lathe will pay for itself in 18 months or less. This machine was designed and built by Monarch Machine Tool Co., Sidney, Ohio.

The lathe will be built in two sizes, 32 and 60 in. The 60 in. machine, designed to handle the largest rolls used in the steel industry, will be put into production later in the year.

In the new Monarch roll turning lathe, standard carbide turning tools are used with speeds as high as 110 sfpm, the contour of the roll being controlled by a tracer unit which operates both carriage and tool slide feed through the medium of magnetic clutches.

Since the contour of the roll is template-controlled, the hundreds of form tools required with the present conventional method of roll turning will no longer be needed. Instead, a round insert type carbide tool will be used to produce literally thousands of different shapes in the roll. As long as the radius on the tool is smaller than the radius or radii required on the roll, the same tool can be used.

Where thousands of tools are now stored away, probably 6 or 8 turning tools will cover all of the shapes required in any one roll shop, it is estimated. While a template is required for every roll, here again there will be a large saving because whatever shape is required or whenever a roll needs to be recut, the template previously prepared will duplicate exactly the contour originally specified. Moreover, the possibility of the operator inadvertently modifying the shape of the contour is completely eliminated.

In operation, the Keller unit with which the new Monarch roll turning lathe is equipped gets its longitudinal feed to the carriage by means of the leadscrew and its cross travel to the tool slide by means of the crossfeed screw. In this particular respect the Keller control differs from nearly every other type of contour control and is particularly applicable to roll turning.

British Steel Federation Anticipates Easing in Steel Supply

London

• • • **The British Iron** & Steel Federation suggests that a "very substantial" easing of steel supply is in prospect. If the accumulation of stocks which occurred last year is not repeated during 1949, the quantity of steel available for processing at home may well increase by 2 million long tons over the 1948 level.

Such an increase, says the Federation, should not only enable the steel industry to meet all forseeable home market demands, but might also justify some further increase in the permitted level of direct exports. Hence, it suggests, the time has come for reconsideration of the whole allocation system, involving its abolition or drastic simplification.

There has been no dearth of observers who have pointed out that British steel production at the rate of 15.5 million long tons a year was running high. But so far they haven't received much attention, here or abroad. The call has been for more and more steel. Every industry has cried that it was starved for steel. Successive government announcements have supported this view.

But an odd doubt is beginning to creep in. Every ton the mills can produce still finds a ready outlet. Of some products, such as sheet and strip, there is still not enough to go around. But consumers and warehouses have been piling up no mean tonnage.

In view of the good start this year, 15.5 million tons seems a realistic forecast of 1949 output. If the Government's Economic Survey turns out to be realistic, the amount of steel available for home use will actually be larger than the estimated long-term requirement.

Average demand for steel in the 1950's was last year officially estimated at 18 million ingot tons (2240 lb), 14.5 million for home use and 3.5 million for direct export. With a prospective home supply this year of over 15 million ingot tons, a notable easing of steel supply should be witnessed in the coming months. Prospective

Steel Production at High Level With Increase in Quantity For Home Consumption

o o o

BY F. H. HARLEY
English Correspondent

o o o

improvement, compared with 1948, is greater than figures suggest, since last year part of production was used to build up stocks instead of passing into consumption.

Last year about 250,000 ingot tons were used to replenish stocks in the steel industry. Another 450,000 tons were added to stocks of consumers and merchants. If no similar stockpiling occurs this year, steel actually used by consuming industries may increase by something like 2 million tons.

The steel industry's main contribution to the export drive has been in the form of indirect exports. But it is one thing to fix targets and quite another to sell the goods. The Economic Survey gives little indication of what government policy would be if British exporters ran into serious difficulties in overseas markets.

Consumption remains held down in some directions by rationing and other controls, and by heavy direct and indirect taxes. The most striking feature of the balance sheet is the increase in potential supplies for "investment" at home in 1949. This amounts to 13 pct—from 9.1 million to 10.3 million tons.

Why should the theme of steel shortage run through the detailed programs of the government's Economic Survey? The Federation suggests it is possible the authors were unaware of the extent to which steel was being stockpiled last year. If this factor were not considered the supply available for fixed investment would apparently rise by no more than 800,000 tons, or less than 9 pct. But the Federation's estimate showed a gain of 1.2 million tons, or above 13 pct. It is hard to believe that shortage of steel would limit the volume of investment if this expectation were fulfilled. The real question is whether investment programs will be able to absorb all the steel available.

The Economic Survey says that in order to make resources available for other programs the railways' replacement program is to be kept at a restricted level. But the Federation comments: "In view of the decline of railway traffic and difficulties over costs, and in the light of recent statements about the improved railroad car capacity available, it may be questioned whether the 'save steel' slogan is not being used to cover a retreat from a position which had been found untenable."

On shipbuilding, the Survey argued that "production will continue to be limited by the amount of steel available." The Federation comments that "this can be true only in the sense that it is limited by the paper allocation system, which appears to be getting more and more out of touch with reality. "Possibly the explanation lies in the authorities' known belief that shipbuilding activity is bound to suffer a long-term decline, and their reluctance to give the shipbuilders any incentive to retain redundant labor."

According to the Federation "it appears doubtful whether the 1949 programs will require anything like the 1.2 million tons of extra steel which seem likely to be available this year."

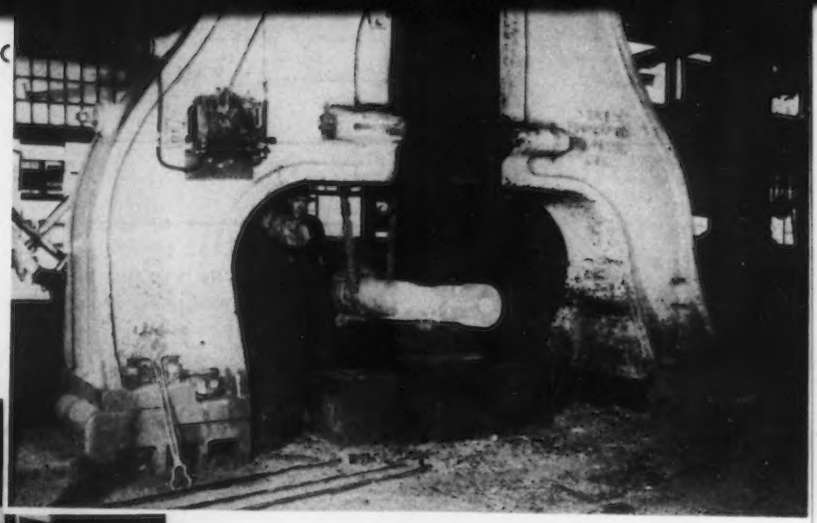
Comparative Balance Sheet of Supply and Consumption — Based On Economic Survey

(In million ingot tons of 2240 lb)

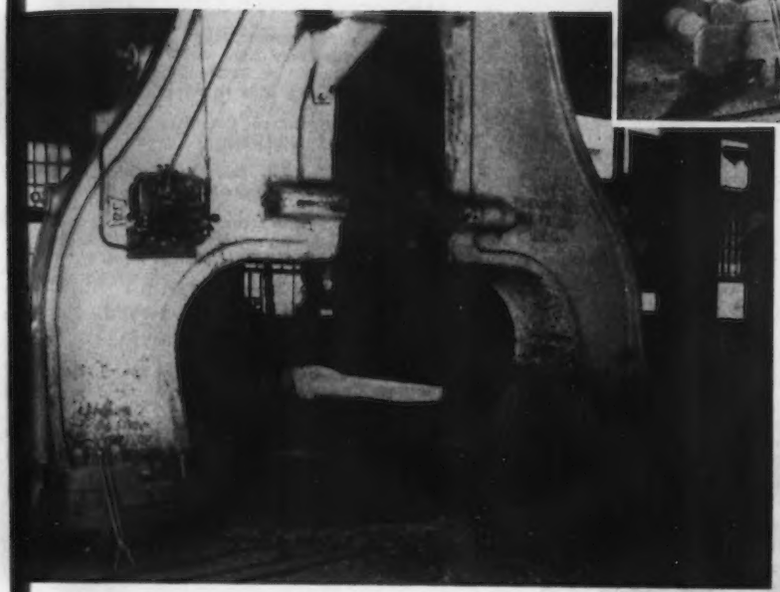
	1938	1948	1949*
SUPPLIES—			
Production	10.4	14.9	15.5
Imports	1.0	0.5	1.2
Re-usable material etc.		0.5	0.5
Total	11.4	15.9	17.2
CONSUMPTION—			
Direct exports	2.0	2.1	2.2
Indirect exports	1.2	2.7	3.0
Consumption and defense	8.7	1.3	1.7
Home investment		9.1	10.3
Total uses	11.9	15.2	17.2
Change in stocks	−0.5	+0.7	
Total	11.4	15.9	17.2

*Forecast

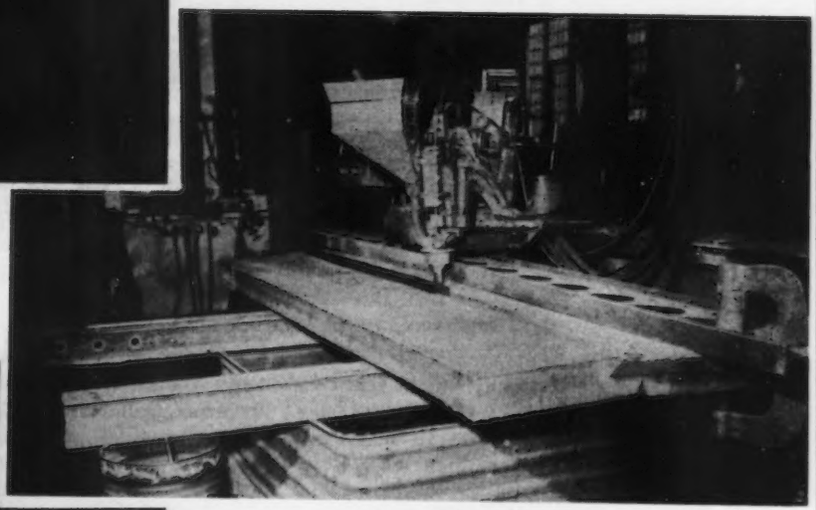
Economies Produced by Welding Scrapped Locomotive Axles for Large Press Dies



• *FIRST step (above) in the production of press dies is to heat the axle to about 2300° F. The axle is then positioned on the anvil block of the drop hammer.*



• *AXLE (above) is flattened under the drop hammer where the desired thickness of the rough billet is controlled.*



• *AFTER flattening, the rough billet (above) is cut to the specified size, prepared with the double V and welded together with the required number of passes on each side.*

• *SEMICOMPLETED weldments (above) that are parts of forming dies.*

• *MALE half (right) of a nearly completed car-part forming die.*

Construction Steel . . .

New York

• • • **The estimated total** bookings of fabricated structural steel for April totaled 97,546 tons, according to report received by the American Institute of Steel Construction, Inc. The bookings for the first 4 months of the year amounted to 485,807 tons, which is 26 pct less than the bookings of the corresponding months of 1948, but 10.6 pct greater than the average bookings for the same months in the five pre-war years 1936-1940.

February shipments were 174,073 tons, slightly over 4 pct greater than for the corresponding month of 1949. Shipments for the first 4 months of 1949 were 6 pct greater than for the same period last year.

The backlog (tonnage available for future fabrication) for the next 4 months only amounts to 628,111 tons.

The tabulation of bookings and shipments for the 4 months is as follows:

	Estimated Total Tonnage for the Entire Industry		Ave.
	1949	1948	1936-1940
Contracts closed			
Jan.	130,418*	160,634	107,578
Feb.	108,764*	130,119	96,280
Mar.	149,079*	213,123	124,558
Apr.	97,546	154,082	110,783
Totals	485,807	657,958	439,199
Shipments			
Jan.	152,746*	146,363	92,578
Feb.	145,879*	141,556	88,626
Mar.	185,885*	167,029	115,031
Apr.	174,073	166,687	123,650
Totals	658,583	621,635	419,885
Tonnage available for fabrication within the next 4 months	628,111	630,317	319,163

• • • **Fabricated steel awards** this week included the following:

915 **Tons,** Hatboro, Pa., LaRosa & Sons, through Turner Construction Co., Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

375 **Tons,** Brooklyn, N. Y. Public School No. 92 to Grand Iron Works, New York.

160 **Tons,** Pittsfield and Williamstown, Mass., bridges over the Housatonic, Pittsfield and Green Rivers, Williamstown, to West End Iron Works, Cambridge.

100 **Tons,** Blossom Point, Va., transmission towers for Virginia Electric Co. through Stone & Webster Engineering Corp. to Bethlehem Fabricators, Bethlehem.

• • • **Fabricated steel inquiries** this week included the following:

725 **Tons,** Sacramento, Calif., steel towers for Perkins-Tracy line, Central Valley Project, Bureau of Reclamation, Sacramento, Spec. R2-62, bids to June 16.

174 **Tons,** Crawford Co., Pa., Pennsylvania Dept. of Highways.

105 **Tons,** Lehigh Co., Pa., Pennsylvania Dept. of Highways.

100 **Tons,** Denver, tunnel work Horsetooth supply conduit, Bureau of Reclamation, Denver, Spec. 2684, bids to June 24.

• • • **Reinforcing bar awards** this week included the following:

390 **Tons,** Niles, Ill., Home for the Aged for St. Andrew Bobola, to John Gebhardt & Sons Co., Chicago.

300 **Tons,** Bethesda, Md., utility building No. 12 for National Health Institute, through McCloskey & Co., to Bethlehem Steel Co., Inc., Bethlehem.

• • • **Reinforcing bar inquiries** this week included the following:

1700 **Tons,** Madison, Wis., Veterans hospital. This inquiry reinstated after being postponed. It was previously reported as a 1000 tons inquiry.

900 **Tons,** Philadelphia, Southwest sewage treatment works, due June 29.

470 **Tons,** Hartford, Conn., reinforced concrete, North Meadows Expressway, W. M. Jones, Hartford, Conn., resident engineer.

265 **Tons,** New Haven, Conn., reinforced concrete box culvert on harbor front, relocation of U. S. Route 1, M. B. Pearce, New Haven, resident engineer.

185 **Tons,** Denver, tunnel work Horsetooth supply conduit, Bureau of Reclamation, Denver, Spec. 2684, bids to June 24.

160 **Tons,** Merced, Calif., Burns Creek Dam, Sacramento District Corps of Engineers, Ser. Eng.-04-167-49-77, bids to June 17.

160 **Tons,** Farmington, Calif., Farmington Dam outlet works, Sacramento District Corps of Engineers, Spec. 1388, bids to June 23.

100 **Tons,** Yolo Co., Calif., bridges between Putah Creek and Colusa Co. line, Calif. Div. of Highways, Sacramento, bids to June 22.

• • • **Steel piling inquiries** this week included the following:

735 **Tons,** Hartford, Conn., reinforced concrete, North Meadows Expressway, Wm. Jones, Hartford, Conn., resident engineer.

• • • **Railroad car awards and inquiries** this week included the following:

The Southern Railway System has placed an order for 200 70-ton, all-steel, covered hopper cars with the Bessemer, Ala., plant of Pullman-Standard Car Mfg. Co. Delivery is expected to begin in August.

50 YEARS AGO

THE IRON AGE, *June 1, 1899*

• "The total quantity of pig iron produced throughout the world in 1898, as far as the figures enable a computation to be made, was about 35 million tons. For the same year the total production of steel of all kinds was about 25 million tons."

• **"Information wanted — who produces machinery for the manufacture of carriage, cart and buggy springs?"**

• "The Standard Oil Co. have acquired the old Russian title as well as a later mineral grant from the United States Government to the coal lands Cook's fields, which are said to be of great extent."

• **"The Park Steel Co. are erecting a large Crucible works adjacent to their present plant in Pittsburgh. The company will manufacture all their own pots for the melting of steel."**

• "Three workmen were killed and three were seriously injured in an explosion at the Cambria blast furnaces, at Johnstown, Pa., last week. The men were on the roof of a building near the furnace, and received a shower of molten iron."

• **"The Pittsburgh Reduction Co. of New Kensington, Pa., have just completed the building of a large rod mill for rolling wire and cables for electrical purposes."**

• "Armor plate bids were opened at noon today. Carnegie and Bethlehem Companies decline to bid on Krupp armor at the limit fixed by Congress, but offer Harvey armor at $400."

• **"The southern mills of the Illinois Steel Co., at South Chicago, Ill., broke last week the world's record of steelmaking in a single run. The new record is 1310 tons."**

Hall Receives Stevens Fifth Annual Award

Hoboken, N. J.

• • • **Powder metallurgy** is readily applicable to the preparation of ingots of metals that are difficult to cast, such as tungsten, molybdenum and thorium, and techniques are available for producing ingots of such metals in a form available for forging or rolling. So indicated Dr. Roy D. Hall in a lecture entitled "The Use of Trace Elements in Powder Metallurgy," delivered under the sponsorship of the powder metallurgy laboratory, Stevens Institute of Technology, Hoboken, N. J., May 25. The institution's fifth annual award was presented to Dr. Hall in acknowledgment of his efforts in contributing materially to the development of powder metallurgy and to translation of its principles to industrial mass production methods.

Dr. Roy D. Hall

In preface to Dr. Hall's address, Gregory J. Comstock, Professor of Powder Metallurgy, reported strides made in powder metallurgy activities in this country and abroad during the past year and touched upon several research phases now under way. Presentation of the fifth annual award was made by Dr. Harvey N. Davis, president of Stevens Institute.

The preparation of metal powders is liable to be a preliminary to any method of production of high melting point metals, indicated Dr. Hall, and if this technique is combined with a low pressure compact and preparation of forgeable ingots of several hundred pounds weight sintered in conventional furnaces, there exists the possibility of costs which will make the potential value of these metals available for practical use. Ingots made in this way would be uniform throughout, would have no waste material to remove and could be controlled for grain size and be of sufficient size to warrant the use of the same equipment and meth-

Photograph courtesy Heintz Manufacturing Company, Phila., Pa.

ods for fabrication as is used in alloy steels, etc.

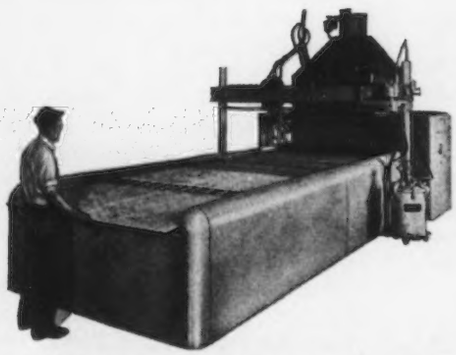
These interesting characteristics were held possible by the speaker, especially when production techniques were associated with (1) small amounts of one element to bring about changes in the properties of the major element, and (2) use of small amounts of reactive gases in the atmosphere used during sintering in order to reduce the temperature required to give dense and strong compacts.

Concerning the possibility of changing properties of metals by adding small amounts of added elements, the speaker recalled the use of calcium, magnesium, and salts of sodium, rubidium, potassium, lithium and barium, and aluminum oxide, which, when used as additives in the manufacture of tungsten lamps, gave definite changes in the final properties of the tungsten wire. Addition of small amounts of nickel as low as 0.25 pct to tungsten powder, for example, permits sintering the mixture between temperatures of 2730° to 2820°F, giving an alloy with a density fully as high as that of treated tungsten and only a little below that of worked tungsten.

With respect to the use of traces of active gases in the atmosphere in which sintering is carried out, gases which give a reversible reaction with the metal, or metals, should be utilized, as for example: Water vapor or steam with tungsten, molybdenum, iron; carbon monoxide with nickel, molybdenum, iron; ammonia with copper, iron; and chlorine, bromine, or iodine with zirconium, tantalum, chromium.

In considering the reaction between water vapor and molybdenum, for instance, it is possible to sinter molybdenum in hydrogen at 2730° to 2820°F in standard electric furnaces used in processing tungsten and molybdenum. If held at that range, then raised to 2910° to 3000°F, clean molybdenum ingots are obtained with a density of 9.8 to 10.0, ready for rolling, forging or any working under proper conditions and temperatures. It is quite simple to make such a process continuous, and there is no limitation to the size of ingots that can be produced other than the size of the pressed forms available and size of furnace for heat treating or sintering.

Putting Air to Work... with Artistry!



This horizontal transverse automatic spray machine is a typical example of DeVilbiss engineering skill. It is capable of coating up to 9600 square feet of wall board every hour.

Artistry in the skillful use of air enables the trumpet player to produce beautiful harmonious tone patterns rather than blatant, discordant noise.

Artistry in the skillful use of air has enabled DeVilbiss to earn an enviable reputation as the world's foremost designer and producers of spray guns and spray finishing systems.

After 61 years of spray equipment manufacturing experience the name DeVilbiss is accepted to mean just one thing . . . *finest performance* . . . dependable performance that helps manufacturers improve product quality, save valuable man-hours, cut costs, produce for less and sell for less. When you want information on "how to spray it best at lowest cost" consult DeVilbiss.

THE DEVILBISS COMPANY • Toledo 1, Ohio

Canadian Plant: WINDSOR, ONTARIO

DE VILBISS *means* **Quality** *in all four..*

DV

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS

Westinghouse Names New Executives For Atomic Power Division

Pittsburgh

• • • **Four scientific** and four executive positions in the Westinghouse Electric Corp.'s Atomic Power Div. have recently been filled here.

Dr. W. E. Shoupp, director of research for the division, said the men would be located at the company's Bettis Field plant where development of an atomic engine for Navy ships now is under way.

Two of the scientists are recently returned from important positions at Oak Ridge National Laboratory. They are Dr. Sidney Siegel, who is appointed manager of physics research, and Dr. W. A. Johnson, who becomes manager of materials and metallurgy research. In addition, Mr. M. A. Schultz has been named manager of instrumentation and control research and Mr. E. C. Barnes has been appointed manager of industrial hygiene.

For the past two years, Dr. Siegel has been on leave of absence from Westinghouse to serve as chief of the radiation effects section of the Oak Ridge National Laboratory research division, Oak Ridge, Tenn. Also returning to Westinghouse after two years' stay at Oak Ridge is Dr. Johnson, who headed the metallurgy division at the Tennessee atomic energy center. Dr. Johnson will direct work of a similar nature at Bettis Field.

Neil D. Cole has been appointed contract supervisor. Mr. Cole comes to the Atomic Power Div. position from a similar one at the Westinghouse Research Laboratories in East Pittsburgh. Charles J. Gerhart has been named security officer and will be responsible for security provisions and supervision of the guard and fire protection forces. The new industrial relations supervisor is Charles F. Stewart—a veteran of 32 years' service for Westinghouse in time study and industrial relations work. Prior to his new assignment Mr. Stewart was a member of the employment department at the Trafford, Pa., plant. C. H. Doran has been appointed supervisor of receiving, stores and shipping.

(CONTINUED FROM PAGE 106)

• **Edward G. Brierty** has been appointed equipment sales representative for the radio division of Sylvania Electric Products Inc., New York, operating out of the company's Chicago office. Mr. Brierty had formerly been associated with Motorola, Inc.

• **C. L. Messecar** has been promoted from business management manager of the St. Louis zone, to assistant zone manager at San Francisco, Pontiac Motor division of General Motors Corp., Pontiac, Mich. **H. L. Robinson,** formerly business management manager at San Francisco, has been appointed assistant zone manager, Los Angeles. **J. M. Turley,** business management manager at Portland, has been appointed assistant zone manager, Cincinnati. **J. F. Malone,** business management manager, Boston, has been made assistant zone manager, Philadelphia. **R. B. Haley,** formerly service manager, has been appointed business management manager of the St. Louis zone; **F. G. MacDonald,** accessories sales, central office, is now parts and accessories representative of the Pontiac zone and **E. J. Howard,** parts sales, central office, has been promoted to parts and accessories representative, Memphis zone.

• **Amos Johnson** has recently joined the field sales department of Stoody Co., Whittier, Calif. He has been assigned to assist the company distributors in Minnesota and the Dakotas.

• **Frank P. Denzel** has been appointed general sales manager of Welding & Cutting Supply Co., Cleveland. Mr. Denzel had formerly been associated with Linde Air Products Co.

• **J. R. Mudler** has been named purchasing agent for the Cleveland plant of the Oliver Corp., Cleveland, succeeding **M. D. Braund,** who has resigned.

• **A. J. Morrison** has been appointed manager of the shaft and tunnel department of the contracting division of Dravo Corp., Pittsburgh. Mr. Morrison started with the company in 1917.

• **J. W. Adelung** has been named manager of the Brooklyn branch of Mack-International Motor Truck Corp., New York. **W. A. Brady** has been named manager of the company's White Plains, N. Y., branch. Mr. Adelung has been with Mack since 1946 as manager of the White Plains branch. Mr. Brady has been with Mack Truck since 1938 in the capacity of salesman.

• **C. W. Schefer** has been appointed manager of the New Britain, Conn., warehouse of A. Milne & Co., New York, succeeding **T. L. Talbot,** who has resigned.

• **George W. Altman** has been appointed foundry engineer for the National Radiator Co., Johnstown, Pa. Before joining National Radiator, Mr. Altman had been general manager of Bridgman Castings, Inc., and had previously been associated with Lennox Furnace Co. and Pittsburgh Coke & Iron Co. **Charles J. Philage** has been appointed acting manager of the advertising department and **Edward J. Sakal,** acting manager of accessory sales in the heating division of National Radiator. Mr. Philage has been with the company since 1945 and has been handling advertising and sales promotional duties since that time. Mr. Sakal joined the company's purchasing department in 1939 and was transferred to heating division sales in 1946.

• **T. F. Perkinson** has been appointed manager of the transportation engineering division of the apparatus department, General Electric Co., Schenectady. Mr. Perkinson, who has been assistant manager of the division since 1946, succeeds **C. M. Davis,** who has retired after nearly 40 years of service. **A. J. Woodward** has retired as division engineer of G.E.'s locomotive engineering division after 41 years of service. **J. C. Rhoads,** who has assisted Mr. Woodward, has been named to succeed him.

• **Peter P. Ruppe** has been appointed general manager of Hapman Conveyors, Inc., Detroit. Mr. Ruppe has been serving as chief engineer and had formerly been connected with U. S. Rubber Co. and Briggs Mfg. Co.

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Hansen Joins Armour Research Foundation

Chicago

• • • **Dr. Max Hansen,** distinguished German metallurgist, will joint the staff of Armour Research Foundation of Illinois Institute of Technology June 1 as senior metallurgist in the nonferrous section of the foundation's metals department.

Dr. Max Hansen

Dr. Hansen will serve as project leader in all projects dealing with nonferrous metals, according to William E. Mahin, chairman of the metals department. His initial work will be on titanium, aluminum-beryllium alloys and copper-alloy wire.

Dr. Hansen has been an associate professor of metallurgical engineering at Illinois Institute of Technology since November 1947.

He came to the United States from Germany in 1947 after completing a compilation of German scientific progress during World War II for the technical field information agency in the United States Military Government office.

March Iron and Steel Exports Are Highest During First Quarter

Washington

• • • **Exports of iron** and steel products during March, amounting to 440,703 net tons, were the highest monthly total recorded in the first quarter of 1949. February exports amounted to 377,391 tons and for January the export total was 427,367 tons, bringing the first quarter total to 1,245,463 tons.

Exports of semifinished steel, plate, sheet, and tinplate all increased substantially during the final month of the quarter. Tinplate shipments of 51,848 tons continued to lead the list of products exported.

The Dept. of Commerce also reported that exports of iron and

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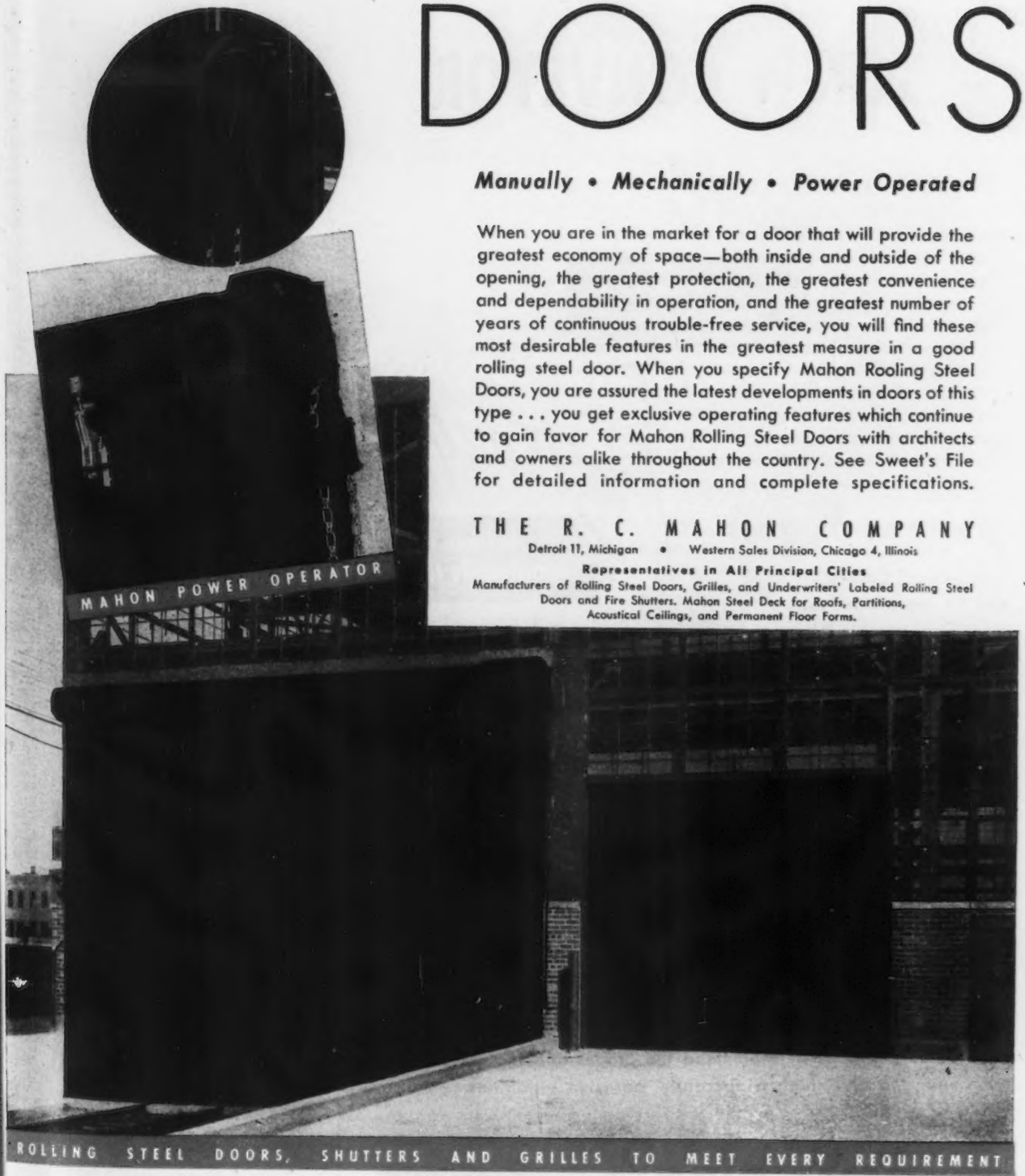

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Two of nine Mahon Rolling Steel Doors installed in a new plant for Production Steel Company, Detroit, Mich. Barton-Marlow Co., General Contractors.

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steel scrap increased from 14,468 tons in February to 17,866 tons in March.

Total export figures for March and for the first quarter 1949 are:

Semifinished and Finished Products:	March 1949	First Quarter 1949
Ingots, blooms, billets, slabs, sheet bars	21,882	51,479
Wire rods	2,236	8,224
Skelp	9,873	20,423
Iron bars	171	479
Concrete reinforcement bars	8,311	27,672
Steel bars, cold-finished	3,812	10,376
Other steel bars (excluding alloy)	26,085	82,575
Alloy steel bars	2,351	6,823
Welding rods, electric	2,213	4,799
Plates including boiler, not fab.	35,565	83,523
Plates, fab., punched or shaped	2,716	8,640
Iron sheets, black	2,144	5,554
Steel sheets, black	45,807	122,450
Galvanized sheets	7,406	18,935
Strip steel, cold rolled	6,468	18,000
Strip steel, hot rolled	7,713	23,061
Tin Plate	51,848	151,204
Terne plate	1,823	4,430
Structural shapes, plain	23,709	70,864
Structural shapes, fab	13,042	47,957
Frames and sashes	279	823
Sheet piling	1,597	5,128
Rails, 60 lb per yd and over	15,253	58,217
Rails, less than 60 lb per yd	816	2,954
Rails, relaying	2,364	4,885
Splice bars and tie plates	1,272	5,551
Frogs and switches	803	3,601
Railroad bolts, nuts, and washers	216	450
Railroad spikes	157	715
Car and locomotive wheels, tires and axles	3,246	11,023
Seamless black pipe and tubes	2,360	7,574
Seamless casing and line pipe	22,365	75,331
Seamless boiler tubes	3,659	12,269
Welded black pipe	8,384	22,987
Welded galvanized pipe	7,663	20,280
Welded casing and line pipe	18,692	33,394
Welded boiler tubes	505	1,168
Other pipe and fittings	5,852	18,044
Plain wire	9,697	25,664
Galvanized wire	6,362	15,633
Barbed wire	4,988	14,468
Woven wire fencing	1,593	4,646
Woven wire screen cloth	563	1,591
Wire rope and strand	1,218	3,860
Wire nails	2,151	5,610
Other wire and manufactures	2,442	7,230
Tacks	151	605
Other nails, incl. staples and horseshoe nails	803	3,031
Bolts, nuts, rivets and washers, except railroad	3,053	8,980
Forgings	2,389	6,817
Horseshoes	25	52
TOTAL	406,093	1,148,514
Other Finished Products:		
Tanks, complete and knocked down	12,565	33,174
Metal lath	859	2,375
Tin and galvanized hollow ware	275	887
Tin cans, finished or unfinished	2,247	12,642
Malleable iron screwed pipe fittings	652	1,676
Cast iron screwed pipe fittings	85	354
Cast iron pressure pipe and fittings	3,685	9,459
Cast iron soil pipe and fittings	754	1,974
Iron castings and ingot molds	4,052	13,061
Steel castings	273	547
Sprocket and other power transmission chains	550	1,393
Other chains	593	1,870
TOTAL	26,590	79,412
Pig iron	**4,455**	**7,901**
Ferroalloys	**3,565**	**9,636**
TOTAL	8,020	17,537
GRAND TOTAL	440,703	1,245,463
Iron and steel scrap	**17,866**	**49,877**

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Steel Comptroller Says Accountant Should Aid In Planning Future

Pittsburgh

• • • **While a great deal** of the accountant's time is preoccupied with assembling and recording financial data, he should help management bridge the gap between the record of the past and the prospects of the future, Robert C. Tyson, assistant comptroller, U. S. Steel Corp., said in a recent address here. He spoke to the Pittsburgh chapter, National Assn. of Cost Accountants.

Mr. Tyson pointed out that the accountant also must be constantly informed of "external factors" which have affected or are likely to influence the finances of a business corporation. He noted in particular that in recent years a many pronged attack has been launched upon profits.

"First, of course, has been the taxation and double taxation of corporate income, which is extremely unfair," Mr. Tyson said. "In past periods when corporate taxes and personal taxes were not large, the consequences of the unfair treatment were not too serious. Present taxation of corporate income is significantly a confiscation of the capital that constitutes the nation's all important tools of production.

"The assault on profits has come from other quarters too. For example, it is almost always true that the presence of a profit is the automatic occasion for demands that it be turned over to labor in the form of increased employment cost, with these demands issued in an atmosphere of political complaisance, if not active support.

"Next, it could be noted that throughout recent periods direct or indirect pressure has been exerted to keep prices of corporate products below what people are competitively willing to pay, thus putting a top-side squeeze on profits.

"Finally, and perhaps most serious, there has developed, in ways hard to define, a general notion that to make a profit is a sin. This is something to which the superficial, out of human greed, can readily subscribe. But the more

thoughtful realize that the prospect of profit is what made this country. They realize that only by providing tools of production can man's capacity to produce more, and so have a better life, be substantially enlarged."

C. C. Carr Retires From Alcoa Position

Pittsburgh

• • • **C. C. Carr,** director of public relations and advertising for Aluminum Co. of America, is retiring from active service with the company after 15 years in that executive capacity. He is being succeeded by Arthur P. Hall, who has been assistant director of public relations and advertising for Alcoa since Dec. 1, 1947.

C. C. Carr

Mr. Carr will become a public relations consultant, with headquarters in St. Petersburg, Fla., after leaving his Alcoa post on June 1. Prior to coming to Pittsburgh with Alcoa in 1934, he was part owner and general manager of the St. Petersburg *Times.* Nationally prominent in public relations and advertising circles, he is a past board chairman of the Assn. of National Advertisers, a member of a Joint Committee on Better Understanding of our Economic System, chairman of the Research Committee of Weekly Newspapers for the Advertising Research Foundation, and a member of the sponsoring committee for the National Assn. of Manufacturers Public Relations Conferences.

Mr. Hall, who will be the new head of Alcoa's public relations and advertising activities, began his career with the company in 1929 as an architectural salesman. He was transferred to the Washington district sales office in 1939, and was made manager there in 1943. In that year he was also named an assistant secretary of the company.

Survey Shows Profits Increase for Metal Industries in 1948

Washington

• • • **Iron and steel** companies showed an increase of 35 pct in profits after taxes in 1948 while the profit of nonferrous industries was 25 pct greater, it is reported by the Securities & Exchange Commission.

This rate was exceeded by the oil and motor vehicle companies, SEC reported, which showed 60 and 40 pct gains, respectively.

The net income of all United States manufacturing corporations last year was listed at $11.5 billion which represents a 14 pct increase. Stockholders as a whole benefited, the report indicated, the increased rate standing at about a half per cent above last year. In companies having assets of $250,000 or less, however, the rate of payment was less.

Other information in the report showed 1948 manufacturing sales at $166 billion. Against this is deducted $147 billion for costs and expenses plus $7 billion in federal income taxes and $4.3 billion in dividends.

Against the 10 pct increase in dollar sales volume was the same percentage increase in costs.

While profits as a whole were higher, trends changed last year. Much of the profits were in producer goods manufacture while consumer goods profits receded. Food, leather goods, and apparel goods profits dropped by 25 pct.

Total manufacturing assets were figured at nearly $109 billion at the end of 1948 and equity of stockholders at $75 billion, an increase of $7 billion during the year.

Iron, Steel Imports Decline While Scrap Material Increased

Washington

• • • **U. S. metalworking** industries imported 191,024 net tons of iron and steel in the first 2 months of 1949, according to the Commerce Dept.

The department's Bureau of Foreign and Domestic Commerce,

in the first of a new series of reports on iron and steel imports, said 98,046 tons were imported in January and 92,978 tons in February.

In addition to these totals, another 162,435 net tons of iron and steel scrap reached U. S. shores during January, and another 198,046 tons during February.

Structural shapes and sheet piling and pig iron accounted for the heaviest tonnages during each of the 2 months. Total imports of 70,924 tons and 59,214 tons, respectively, arrived at 7 U. S. ports during the 2-month period.

Net tonnages of iron and steel imports as compiled by the American Iron & Steel Institute from Commerce Dept. figures are as follows:

	JAN. 1949	FEB. 1949
Semifinished and Finished Products:		
Steel ingots, blooms, etc....	5,999	5,612
Wire rods	381	447
Iron bars and slabs	43	93
Concrete reinforcement bars	1,261	1,079
Hollow bar and drill steel..	—	3
Other steel bars	2,408	6,300
Boiler and other plate	3,296	1,816
Sheets, skelp, sawplates, N.E.S.	2,418	7
Tin plate, taggers tin and terne plate	—	1
Other hoops and bands	690	1,468
Structural shapes and sheet piling	34,918	36,006
Rails and fastenings	18	274
Wheels and axles	—	—
Pipe and tubes	386	630
Round wire	1	6
Barbed wire	—	—
Flat wire and strip	131	119
Telegraph and telephone wire	32	1
Wire rope and strand	32	68
Wire fencing	—	—
Nails, tacks, and staples....	71	137
Bolts, nuts and rivets	10	9
Castings and forgings	16	5
Die blocks and blanks	325	156
TOTAL	52,822	54,237
Other Finished Products:		
Cast iron pipe and fittings..	89	10
Malleable iron pipe fittings..	—	1
Enameled or glazed ware and utensils	—	—
Power transmission and other chains	12	7
TOTAL	101	18
Pig iron	34,917	24,297
Sponge iron	188	493
Ferromanganese (manganese content)	7,804	12,185
Spiegeleisen	—	—
Ferrosilicon (silicon content).	91	90
Ferrochrome (chromium content)	449	223
Other alloys used in steel manufacturing	1,674	1,435
TOTAL	45,123	38,723
GRAND TOTAL	98,046	92,978
Iron and steel scrap 162,435		198,046

Opens Model Consuming Goods Testing Exhibit

Chicago

• • • **A model** consuming goods testing laboratory exhibit was opened to the public recently at the Museum of Science and Industry in Chicago. This exhibit is sponsored by Sears, Roebuck & Co. and is patterned after Sears' laboratory which they have run since 1911. The exhibit consists of chemical and physical testing of many consumer goods items in the electrical, home economics, mechanical, combustion, refrigeration, air conditioning, automotive and radio electronic fields.

Carrying out the Museum's ideas about visitor operated exhibits, the displays permit the visitor to become a test technician and run some of the tests applied to the different items. The purpose of the exhibit is to give the public a birds' eye view of the operations of a testing laboratory. The three general types of tests used in the laboratory and presented in the exhibit involve: check testing to verify producers' claims; comparative testing of the goods of various producers; and fact finding testing to determine a wide range of information on a specific item.

Briggs Reports Earnings

Detroit

• • • **Earnings at Briggs** Mfg. Co. for the first quarter of 1949, including automobile bodies and plumbing appliances, total $465,504.

The report said that Briggs is currently employing more than 35,000 persons. Steel inventories have improved steadily, it is indicated. Briggs' new metalworking plant at Youngstown is expected to go in operation in the near future.

Hewitt-Robins Net Up

Detroit

• • • **Hewitt-Robins, Inc.,** reported for the quarter ended Mar. 31 net income of $219,805, equal to 79¢ a share. In the corresponding period of 1948, the company had a net loss of $108,092, due to a 10-week strike at its Buffalo plant. Sales for the first 3 months of 1949 were $5,513,619 compared with $3,256,327 a year ago.

Michigan Bank Deposits Reach an All-Time High

Lansing, Mich.

• • • **Michigan bank deposits** reached an all-time high of nearly $5 billion in January 1949, according to the Michigan Department of Economic Development. An analysis of bank balances showed that the deposits in "big industry" counties are generally up or steady; deposits in many agricultural and "small-industry" counties have declined; the trend is downward in lower Michigan recreational-agricultural areas.

The report shows that 56 pct of the state's total deposits are in Wayne County banks. Five other counties have deposits over $100 million, the committee said. These are Kent, Oakland, Genesee, Saginaw and Ingham Counties.

Customers Shown New Warehousing Facilities

Cleveland

• • • **United States Steel** Supply Co. was host recently to more than 3000 customers in its new warehouse here at 7105 Bessemer Ave.

L. B. Worthington, president of the U. S. Steel subsidiary, and E. J. Heffner, Cleveland district manager, were official hosts for the function.

The new plant was near completion last summer when fire destroyed the former warehouse. Operations then were started in the new facilities and the plant has served customers ever since.

The warehouse, covering 167,000 sq ft of space, was described by Mr. Worthington as one of the most modern steel warehousing facilities in the country. It was designed, he said, to provide the maximum in efficient service to buyers.

The latest equipment has been installed to maintain speedy customer service, including a hydraulically controlled high speed friction saw. The saw's circular blade cuts through steel at 320 mph amid a shower of sparks. Keeping this cutting machine cool requires 75 gal of water per min applied at 240 psi. The saw can knife through all sizes of steel beams with a clean cut, slicing them to specified lengths.

Another steel warehousing de-

velopment used in the plant is a 52-ft overhead transfer crane that assembles orders for shipping, loads trucks and moves steel from one aisle to another. The crane can carry 10 tons, travel 300 fpm and can be controlled from the floor or cab.

All traffic in the warehouse is directed so that it moves in one direction. Incoming steel is received at the east end of the building and is stored, processed and handled in the four main aisles each about 440 ft long. Orders for shipment are moved to the transfer aisle for loading on trucks that move out the west end of the building.

Gives Diecasting Machine

Chicago

• • • **A $10,000 diecasting** machine has been given to the metallurgical engineering department at Illinois Institute of Technology by the Doehler-Jarvis Corp.

The machine, constructed by Doehler-Jarvis especially for use in instruction and research, is the second of its kind in the country. The first, also built by Doehler-Jarvis, was donated to Massachusetts Institute of Technology several months ago.

The corporation plans to give three similar machines to other institutions in the near future.

Dr. Otto Zmeskal, professor and director of the department of metallurgical engineering, states that the machine at Illinois Tech will be used primarily "for research in developing new alloys for casting dies and improving and developing alloys that are now used to make dies."

Electrochemists Elect

Pittsburgh

• • • **Dr. J. C. Warner,** Dean of Graduate Studies and head of the Chemistry Department at Carnegie Institute of Technology, has been elected vice-president and a member of the board of directors of the Electrochemical Society. He is a former chairman of the Pittsburgh section of the Society.

An international organization, the 47-year-old Society covers the fields of electrochemistry, electrometallurgy, electrothermics and electronics.

Auto Industry Leads As No. 1 Steel User; Oil, Gas Show Gains

New York

• • • **Among major industries** the oil and gas industries obtained the greatest increase in shipments of finished steel in 1948 over 1947, both in tonnage and in percentage of gain, according to the American Iron & Steel Institute. The total of nearly 4.3 million net tons last year for oil and gas drilling, pipe lines, refineries and associated construction was 34 pct greater than in 1947 and more than twice the 1946 tonnage.

The institute's report showed the distribution of the record total of 65,973,000 tons of finished steel shipped during 1948.

The spectacular increase in shipments of steel was a vital factor in overcoming fear of a national oil shortage and placed oil and gas as the sixth largest buyer of steel, with 6.5 pct of total shipments.

Nearly all other classes of consumers also shared in the 1948 increase in shipments of steel. The automotive industry continued in first place among manufacturing consumers, taking 10,221,000 tons, equal to 15.5 pct of total shipments. Jobbers and dealers, serving mainly the thousands of small businesses but excluding jobbers serving the oil and gas industries, received an increased tonnage last year, totaling 9,971,886 tons, though their percentage was practically unchanged at 15 pct.

Total shipments for construction and contractors' products, exclusive of oil and gas, also increased. The total of 7,623,000 tons amounted to 11.6 pct of all shipments.

Manufacturers of appliances, utensils and cutlery received one of the largest increases, their portion of shipments moving up from 2.5 to 3.0 pct.

Railroad transportation received 5,225,000 tons in 1948, an increase of approximately 345,000 tons. That industry got nearly 8 pct of total steel, against 7.7 pct in 1947. Agricultural equipment makers received 1,427,000 tons, a tonnage larger than ever before. Nearly twice as much steel went to shipbuilding and marine equipment in 1948 as in 1947.

With the aid of the largest receipts of steel in many years, builders of railroad equipment turned out in 1948 the greatest number of freight cars since the early 1920's. The total of freight cars delivered to domestic railroads last year was 112,634, an increase of 44,082 over 1947 deliveries.

Shipments of steel to freight car builders in 1948 were 2,739,119 net tons, an increase of 557,000 tons over 1947. This gain of 25 pct was greater than the increase in most other industrial shipments of steel.

SHIPMENTS OF STEEL PRODUCTS BY MARKET CLASSIFICATIONS

Market Classifications	1948 Shipments (N.T.)	1948 Per Cent of Total	1947 Shipments (N.T.)	1947 Per Cent of Total	1946 Shipments (N.T.)	1946 Per Cent of Total
1. Steel for converting and processing	3,348,414	5.1	2,772,163	4.3	1,882,561	3.9
2. Forgings (other than automotive)	938,838	1.4	741,044	1.2	651,706	1.3
3. Bolts, nuts, rivets and screws	1,284,653	1.9	1,293,027	2.1	1,054,717	2.2
4. Jobbers (except oil and gas)	9,971,886	15.1	9,545,654	15.1	8,405,793	17.3
5. Construction and maintenance (except oil and gas)	5,115,195	7.8	5,337,065	8.4	4,153,041	8.5
6. Contractor's products	2,507,977	3.8	2,243,399	3.6	1,598,739	3.3
7. Automotive (incl. automotive forgings)	10,220,982	15.5	9,273,363	14.8	6,557,199	13.4
8. Rail transportation	5,225,535	7.9	4,879,879	7.7	3,806,746	7.8
9. Shipbuilding and marine equipment	649,613	1.0	337,961	0.5	283,803	0.6
10. Aircraft	35,761	0.1	39,231	0.1	28,465	0.0
11. Oil and gas drilling (incl. jobbers and constr.)	4,280,164	6.5	3,189,361	5.1	2,010,460	4.1
12. Mining, quarrying and lumbering	329,090	0.5	287,670	0.4	209,758	0.4
13. Agricultural	1,426,943	2.2	1,244,548	2.0	1,030,335	2.1
14. Machinery (except electrical)	3,188,718	4.8	3,031,719	4.8	2,415,517	5.0
15. Electrical machinery and equipment	1,594,700	2.4	1,595,520	2.5	1,154,506	2.4
16. Appliances, utensils and cutlery	1,959,878	3.0	1,564,722	2.5	1,227,154	2.5
17. Other domestic and commercial equipment	1,713,606	2.6	1,680,259	2.7	1,398,055	2.9
18. Containers	5,302,373	8.0	5,076,170	8.0	4,255,287	8.7
19. Ordnance and other military	56,029	0.1	56,908	0.1	30,458	0.0
20. Export	3,244,888	4.9	4,206,692	6.7	3,011,771	6.2
21. Shipments of non-reporting companies	3,577,695	5.4	4,660,795	7.4	3,609,461	7.4
Total	65,973,138	100.0	63,057,150	100.0	48,775,532	100.0

Industrial Furnace Men Talk Costs Efficiency

Virginia Beach, Va.

• • • **Viewing the** changing business conditions somewhat optimistically from the standpoint of the furnace manufacturing field, members of the Industrial Furnace Manufacturers Assn. were nevertheless made aware of the need for increasing production efficiency, thereby cutting costs, at the group's 19th annual meeting, held in Virginia Beach, Va., recently.

W. E. Borbonus

Highlight of the meeting was the election of W. E. Borbonus, president of R. S. Products Corp., Philadelphia, as president for the coming year. New directors elected included: H. M. Heyn, Surface Combustion Corp., Toledo, representing the ceramic division of IFMA; M. L. Snodgrass, furnace division, Gas Machinery Co., Cleveland, representing the combustion division of IFMA; and C. B. Kentnor, Jr., president of W. S. Rockwell Co., Fairfield, Conn., representing the oven division.

The technical phase of the session touched upon the many phases of the industry's problems, and was featured by the presentation of several formal papers: "Analysis of Financial Statements," by Arch M. Raub, manager, special information division, Dun & Bradstreet, Inc., New York; "Tax and Jurisdictional Problems," by John R. Scholl, Scholl & Dougherty, Philadelphia; "Production Control," by R. C. Trundle. Trundle Engineering Co., Cleveland; and "Rubber Stamps Cut Engineering Costs," by L. H. Remiker, chief engineer, Lindberg Engineering Co., Chicago.

Celebrates 80th Anniversary

Chicago

• • • **The Western Society** of Engineers celebrated its 80th anniversary on May 25, 1949, and also dedicated its new headquarters at 84 E. Randolph St., in Chicago.

The society has taken over the fifth, sixth and seventh floors of the John Crerar Library property.

Sets Production Record For Ingots and Castings

Toronto

• • • **Canadian production** of steel ingots and casting in March which totaled 298,461 net tons for a daily average of 92.6 pct of rated capacity exceeded all previous monthly records, and compares with 259,271 tons or 89.1 pct for February and 286,026 tons or 88.8 pct for March, 1948. Output for March this year included 287,885 tons of steel ingots and 10,576 tons of steel castings.

Charges to steel furnaces in March included 160,587 tons of pig iron; 82,002 tons of scrap of consumers' own make and 90,102 tons of purchased scrap.

For the first quarter this year production of steel ingots and castings totaled 842,439 net tons against 782,398 tons in the corresponding 3 months of 1948 and 748,752 tons in 1947.

Following are comparative monthly production totals for 1949 in net tons:

1949	Steel Ingots	Castings
January	275,987	8,720
February	249,009	10,262
March	287,885	10,576
Total 3 months...	812,881	29,558

Stockholders Invited To Industrial Exhibits

Cleveland

• • • **To give its shareholders** the opportunity of learning more at first hand about its products, their application scope and sales potentials throughout American industry, Reliance Electric & Engineering Co. has inaugurated a new custom in connection with the company's exhibits at various industrial expositions throughout the country in which the company will participate. Reliance stockholders of the area in which a trade show is to be held are invited to attend the company's exhibit as special guests of J. W. Corey, president.

This idea in furthering stockholder relations was first put into practice by Reliance at the 4-day American Mining Congress Coal Exposition and Convention in Cleveland. The show, where more mining equipment was displayed than ever before gathered under a

single roof, attracted more than 10,000 coal mine operators and equipment manufacturers.

"Reliance realizes that stockholders would like to know more about the products of a company in which they own an interest," Mr. Corey said. "This idea of having stockholders in an area where Reliance participates in a trade show come to the exhibit and personally see their company's products and their end-uses appeals to us as one very convenient way for management to get its message across to stockholders and further cement management-stockholder relations.

"At the same time," Mr. Corey added, "many Reliance stockholders get a more complete picture of their company, its operations, products and sales possibilities through such a visit."

Of the Reliance stockholder group who attended the Reliance exhibit at the Coal Show, 29 were women.

Chrysler Earnings Up

Detroit

• • • **During the first quarter** of 1949, Chrysler Corp. earned $18,707,951 compared with $14,921,644 for the same period in 1948.

Sales of Chrysler cars, trucks, parts and accessories for the first 3 months of 1949 were $401,245,547 compared with $336,519,790 during the same period a year ago. According to K. T. Keller, president of the company, good volume production has been attained on Plymouth, Dodge, DeSoto and Chrysler automobiles. In addition, the new lower-priced Plymouth and Dodge cars are coming into production, Keller said.

Declares Extra Dividend

Cleveland

• • • **Directors of Republic Steel** Corp recently declared the regular dividend of $1.50 per share on the 6 pct cumulative convertible prior preference stock, Series A, payable July 1, 1949, to stockholders of record June 10, 1949, and a regular dividend of 25¢ per share on the common stock, payable July 2 to stockholders of record June 10.

The board also declared an extra dividend of 25¢ per share on the common stock, likewise payable July 2 to stockholders of record June 10, 1949.

Expects Demand For Steel Products To Hold Up During '49

Montreal

• • • **C. B. Lang,** president of Dominion Steel & Coal Corp., stated that, "It appears at the present time that the demand for steel products will remain at a high level during the current year, but supplies and demand are much closer to being in balance than they have been at any time since the outbreak of war, and there is evidence of some falling off in demand for certain products."

Dealing with his own company, Mr. Lang stated:

"The net additions to properties and plant during the past year amounted to $6,046,016. Expenditures for these additions were made mainly at the Sydney steel plant and on the modernization of Canadian Tube & Steel Products, Ltd. Substantial amounts also were expended in the plants of the subsidiary companies of Nova Scotia Steel & Coal Co., Ltd.

"The overall ingots production last year was about 10 pct greater than in 1947, despite the fact that production in Montreal was adversely affected to the extent of about 9 pct due to the shortage of power.

"**It is recognized** that unduly high prices for products resulting from increased costs will inevitably cause abandonment or deferment of purchases requiring substantial steel tonnages, and every effort and consideration should be given that factor so as to avoid curtailed operations with resultant unemployment.

"Steel demand for the past year again exceeded the productive capacity of the country and the government continued to direct the primary steel production and distribution.

"The operation of our steel converting units were slightly higher than in 1947, but we were unable to operate them to the capacity that the demand justified owing to diversion of semifinished steel to other Canadian steel plants as directed by the government.

"With the entry of Newfoundland into Canada this company becomes the only primary steel producer using Canadian raw ma-

terials exclusively, and its operations are not dependent on supplies from any other country.

"**Production** at the ore mines in Newfoundland was approximately at capacity during the year, and contracts have been negotiated which will permit similar activity during 1949.

"It is anticipated the company's new coke ovens will be in operation early in June. In accordance with an arrangement made with the government, we will bring into production this year additional capacity of about 70,000 tons per annum, which, with 50,000 tons from present capacity, has been disposed of for a 2-year period. The company will finance the capital cost of the expansion from its own resources. We offered further to provide facilities for an additional 100,000 tons per annum if a market could be assured for a sufficient period to permit amortization of the capital cost involved. The present exceptionally high capital cost of plant and equipment necessitates a reasonable assurance of a satisfactory market for increased production.

"The increased converting facilities provided over the past few years have resulted in a well-balanced position between steelmaking and converting facilities."

Canadian Production Pig Iron, Ferroalloys Sets New All-Time High

Toronto

• • • **Canadian pig iron** production made a new all-time high monthly record in March when output totaled 202,130 net tons, which was a daily average of 86.7 pct of the country's total rated capacity. For February production totaled 172,724 tons or 82 pct, and in March 1948 output amounted to 172,674 tons or 74 pct of rated capacity. For March this year output included 165,190 tons of basic iron of which 152,475 tons were for further use of producers and 12,715 tons for sale; 19,201 tons of foundry iron with 296 tons for further use and 18,905 tons for sale and 17,739 tons of malleable iron, all for sale.

During the month under review 12 of the 14 blast furnaces were blowing and furnace charges included 367,601 tons of iron ore;

34,175 tons of mill cinder, scale, sinter, etc., and 9717 tons of scrap.

In the first 3 months this year pig iron production totaled 557,928 net tons which compares with 483,840 tons for the corresponding period of 1948 and 492,348 tons in 1947.

For March 22,457 tons of ferroalloys were produced in Canada, against 21,713 tons in February and 14,293 tons in March, 1948. For March this year production by tonnage included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus. For the 3 months ended Mar. 31, 1948, cumulative output of ferroalloys totaled 66,101 net tons against 43,241 tons in the 1948 period and 33,198 tons in 1947.

Following are comparative monthly production figures for 1949 in net tons:

1949	Pig iron	Ferroalloys
January	183,074	21,931
February	172,724	21,713
March	202,130	22,457
Total 3 Months	557,928	66,101

ECA Allocates Funds For Electric Power Expansion in Europe

Washington

• • • **Nearly $11 million** in Marshall Plan funds for the expansion of electric power in Greece and Italy have been made available by the Economic Cooperation Administration.

About $6 million will be allocated for increasing the power in the Athens-Piraeus area by 22,000 kw. Present capacity of the Athens-Piraeus Electric Co.'s plant is about 84,000 kw against a demand of 96,000.

Postwar recovery demands are increasing at a rate of 12,000 kw a year, triple the prewar rate. Long range planning calls for an eventual capacity of 156,000 kw.

Equipment to be purchased includes a steam turbine, diesel generating units, two high and two low pressure boilers, transformers, switches and related equipment.

About half the total allocation will be spent in the United States while another $2.5 million will be used for British equipment. The Greek company will put up nearly $2 million of its own funds while a half million in Greek counter-

part funds will go for labor and local material.

Another $5 million has been set aside for expansion and improvement of two Italian power plants —one at Naples and the other at Palermo, Sicily. Nearly all the equipment for increasing Italian power by 90,000 kw will be bought from American manufacturers.

The Palermo authorization of $1.5 million is in addition to $4.8 million approved on Apr. 1 and will add 60,000 kw. The Naples project increases power output by 30,000 kw at a cost to ECA of nearly $3.5 million. Italian counterpart and other funds of nearly 5 billion lire will be used for labor and local materials.

This makes three power expansions approved for Italy by ECA. The other was a $6 million authorization for increasing Genoa's power output by 50,000 kw, approved Apr. 1.

Service Forces Adopt New Regulations On Patents, Copyrights

Washington

• • • **A new joint** regulation on patents and copyrights which is more liberal toward military contractors and at the same time fully protects the government's interest has been adopted by the Army, Navy and Air Force, to become effective July 1, 1949.

The new regulation, Section IX, "Patents and Copyrights," is the eleventh section of the Armed Services Procurement Regulation issued under the military services' program to develop unified procedures for use by all three departments.

While the new section does not differ radically from the former separate requirements of the three departments, in some respects it is less strict in regard to the amount of reporting to be done by contractors. To some extent, it also liberalizes patent and copyright provisions to be included in military contracts.

One new requirement is that inventions involving fissionable material or atomic energy developed during the course of a research and development contract are to be reported promptly to the Atomic Energy Commission, which will take charge of the inventions

and information concerning them.

Some of the principal features of the new section are:

(1) When the government obtains a license under a patent resulting from a research and development contract, it cannot use the license to manufacture or have manufactured material to be supplied to the general public in competition with the contractor or his commercial licensees.

(2) If no inventions have been made, or for the first time actually reduced to practice, under a research and development contract, the contractor must so certify to the government.

(3) Regulations have been strengthened to give the government more assurance that the price it pays for an article does not include an amount for royalties on a patent on which it already has a license.

(4) Considerable leeway is given to the contactor in reporting royalties. He is given the choice of two alternate methods of making such reports depending upon the nature of his accounting procedures. Also, more time is allowed in which to file royalty reports.

(5) The patent indemnity clause has been rewritten to provide more safeguards for the contractor and to limit its use.

Appoints Fair Trade Practices Committee

Washington

• • • **The Institute** of Scrap Iron & Steel, Inc. has appointed a fair trade practices committee to cooperate with similar committees from other trade associations in the waste materials field.

Benjamin Schwartz, Benjamin Schwartz Co., New York, has been appointed chairman of this committee. Other members of the committee are: Samuel Hurwich, Hurwich Iron Co., South Bend, Ind.; H. R. Nathan, Gendelman & Nathan Iron & Metal Co., Detroit; Leo Dragat, H. Dragat & Sons, Inc., Hartford; J. Z. Steinberg, Chicago Metals Co., Chicago.

Dividend Payments Up 7 Pct in First Quarter

Washington

• • • **Cash dividends** paid out by corporations during first quarter 1949 are estimated at around $2.25 billion, about 7 pct above last year.

Those reported publicly during the 3 months totaled $1.44 billion, according to the Office of Business Economics. They account for about 60 pct of all such payments.

Steel dividends announced for the quarter amounted to $80 million as against $72 million for the same period in 1948. Nonferrous metal companies reported $28.1 million as compared with $26.7 million last year.

Returns to automotive stockholders were up 40 pct, largely because of sharply increased declarations by a single company. Cash payments for the industry were reported at $95 million as against $68 million for last year's first quarter.

Railroad payments were also up. Payments reported totaled $69.6 million as compared with $54 million last year.

Among those reporting declines in dividends were food, beverage, tobacco, textile, and leather industries.

Elects Officers, Directors

Syracuse, N. Y.

• • • **At the annual** meeting of the Purchasing Agents Assn. of Syracuse and central New York held here recently the following officers and directors were elected: President, D. H. Covert, International Business Machines Corp., Endicott, N. Y.; first vice-president, F. L. Howard, Baker Sales & Service, Cicero, N. Y.; second vice-president, J. M. Austin, Oneida, Ltd., Oneida, N. Y.; treasurer, M. Riepel, Alexander Grant's Sons Co., Syracuse; secretary, F. L. McCaffrey, Auto-Lite Battery Corp. Owen-Dyneto Div., Syracuse.

Others elected were: National director, J. E. Edmonds, Lipe-Rollway Corp., Syracuse; and directors, D. E. Hethington, Crouse-Hinds Co., Syracuse; W. E. Doherty, St. Regis Paper Co., Oswego, N. Y.; J. H. Holton, Carrier Corp., Syracuse; A. Kemp Stevens, Aircooled Motors Corp., Syracuse.

Machine Tool Builders Fight for Orders As New Business Drops

• • • **Machine tool builders** were fighting for orders in major sales sectors this week as the industry appeared to be heading for a third quarter tailspin, according to reliable sources in the trade.

Within the past 30 days, a number of plants that heretofore were getting fair order volume have reported a sharp decline in new business, making maintenance of normal operations difficult, if not impossible.

A concensus of trade source opinion is that machine tool order volume will go lower before it levels off and perhaps picks up, a development hopefully anticipated late this fall.

As matters now stand, the industry is caught in a period of business uncertainty, in which labor's demands are a prime factor, and falling prices, which makes buyers of capital goods reluctant to get out their checkbooks.

Many major buyers of machine tools anticipate, correctly or incorrectly, a drop in steel prices which they feel will bring down the prices of capital goods all along the line. Some price reductions have already been made which encourages those who are holding out to continue a while longer, which makes for no orders.

On the other hand, machine tool builders know about as well as anybody that cutting prices doesn't drive in business and in fact, the only price device that brings in business in a market like the present is an increase, which is about as unlikely as a price cut.

The machine tool industry's answer to the buyers will very likely be new machines, but redesign also costs money, particularly in a period when some companies are probably more concerned with meeting payrolls.

Bright spot in this dilemma as the plant vacation period nears is ECA which will be a major source of business for machine tool builders for the next few months. Tentative allocations of funds available for the fiscal year of 1949-50 for U. S. machine tools alone are as follows:

Labor's Demands, Falling Prices, Steel Prices Responsible For Present Condition

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France	$17,200,000
Italy	15,000,000
United Kingdom	14,022,000
Sweden	5,000,000
Switzerland	5,000,000
Belgium	3,700,000
Bizone Germany	3,400,000
The Netherlands	5,000,000
Austria	2,816,000
Denmark	3,000,000
Norway	2,000,000

Other nations will participate in smaller sums, as they are not large users of machine tools. These nations include Greece, Iceland, Ireland, Portugal, Turkey and Trieste.

Bizone Germany expects authorization to purchase machine tools in the first quarter of the calendar year of 1949 to the value of $3.2 million, the first substantial sum that has been available to them for this purpose. Some of this business has already been placed. Requests for the second quarter, according to reports, total $56 million, due to the removal of uncertainties as to what plants are destined for removal or reparations.

Italy has requested $19 million to be allocated for the purchase of machine tools before July 1, 1949.

Actual shipments of machine tools under ECA during the current fiscal year reaching $30 million and are likely to go higher. For the fiscal year which begins July 1, 1949, allocation for U. S. machine tools for all nations is about $75 million, a total which approaches normal U. S. machine tool sales volume to the participating nations.

In Cleveland, a new wage and contract proposal by Warner & Swasey Co., strikebound since Dec. 27, was rejected last week by members of the striking union, District 54, International Assn of Machinists. The vote, by secret ballot, was 892 to 156 against acceptance of the company's proposal in which wage increases ranging up to 17¢ an hr for workers under the top scale and no boost for those with long service and receiving the top wage scale and more.

It was similar, according to reports, with the exception of a few minor changes, to an earlier offer made by the company and rejected in March by the union, which is seeking a 10¢ hourly wage increase reduced from 19¢ and six paid holidays. The proposed contract was turned down at a meeting which was addressed by Elmer Walker, international vice-president, here for the union and two Warner & Swasey Co. vice-presidents, Lloyd D. McDonald and Walter K. Bailey.

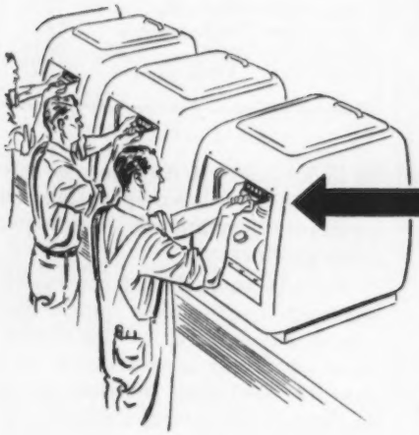
In Detroit estimating departments are as active as ever but most sources admit that sales volume has fallen appreciably since a year ago. Most sources report that used machinery sales are off more than new equipment.

Indications are that old machines will be modified or reworked on as many jobs as possible and this is reported to have limited buying of new equipment still further.

Reports from Muskegon indicate that the new Continental engine plant will be in large scale production within 60 days. Total cost of this program is $9 million.

Detroit tool and die activity looks a little brighter at the moment but current reports show that employment has fallen 25 pct and total hours worked are down more than a third compared to a year ago. There is some hope, however, that several new placements will be made within the next 30 days. Detroit machine shops are watching with interest the effect of a recent 7¢ per hr boost of the tool and die wage scale in the Chicago area.

Build-in **Veeder-Root** Counters



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Veeder-Root Counters can be *engineered into the design* of almost all types of machines, from addressing to vending.

These counters do countless things, depending on the application and its peculiar requirements. They add new usefulness to a product—new merchandising appeal. They help prove the product's service guarantee, sometimes even help the customer pay! They help prevent errors, delays, shortages, overruns, waste, danger. They help provide an equitable basis for wage payment and incentives. Or they can help to co-ordinate production and work-schedules more closely—as well as anticipate maintenance needs.

Those are a few of the jobs being done every day by Veeder-Root *Count*rol. *How?* That's for us to tell *you!* So if you want to count your way to greater sales and profits—*write.*

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Veeder-Root COUNTERS

Copper, Lead, Zinc Price Reductions Fail to Spur Demand

Scrap Prices Also Lowered In Sympathy With Weaker Primary Metal Market

o o o

New York

• • • **Further reductions** in metals prices were made last week, affecting copper, lead and zinc. Despite the repeated reductions in the prices of all three metals, there has been no indication so far of any important improvement in the demand for metals.

Electrolytic copper for Valley delivery has been established at 17.625¢, a price set originally by export of a good tonnage to Italy at that price f.a.s. New York and followed by a bid on 300 tons for the Philadelphia mint taken by American Metal Co. at 17.50¢. A number of bidders offered copper below the 18.00¢ level. Since May 25, copper has been offered generally at the new level. But some mine producers are still holding at higher published prices. They report that there are no tonnages being sought to warrant the establishment of lower prices. It is known that some producers nevertheless, are selling on contracts based on average monthly prices.

Lead was reduced another cent on May 26, only 5 days after the last previous drop. Lead is 11.85¢ St. Louis, 12.00¢ New York, down 9½¢ from the peak price of 3 months ago.

Following the reduction of 1¢ in the price of zinc on May 24, there was a widespread belief in the trade last week that there would be a further reduction within a few days. Information that the government would not need to add to its stockpile of zinc during the next fiscal year removed one more stabilizing factor in the market.

St. Joseph Lead Co. has not followed the reductions on lead or zinc, although it is selling on yearly contracts on an average monthly price basis. Rather than sell at the current low prices, the company is building stocks.

Aluminum ingot prices are down by about ½¢ per lb in the last week. This places some grades as much as 3.5¢ below the price of virgin ingot.

Refineries dropped their buying prices for copper scrap by ½¢ per lb during the week. Dealers' buying prices for copper, lead, zinc and type metals were reduced to correspond with the lower metals prices.

Brass mills had not put new prices into effect by week end. They were ready to meet competition as soon as any mill announced lower prices. But the expectation that there would be further reductions to take into consideration within the next few days prevented any mill from taking the initiative.

The present market highlights the difference in the field of interest of mine producers and custom smelters. The latter can afford to reduce prices when the market dries up so as to take any business offered. By reducing the selling price of a metal, the action also serves to reduce the ore buying price. Producers, on the other hand, find themselves hamstrung by fixed mining costs from dropping below a specific price level. When this point is reached, it is necessary to decide whether mine operations can be continued at the going prices or whether metal can be held for a rise in the market. In many cases it may become necessary to shut down operations for a time or permanently close down mine production.

It is the operation of the custom smelters that makes nonferrous metals so sensitive to the fluctuations of supply and demand. In a sharply declining market, price leadership by custom smelters can be a factor in pushing down prices so far that a large number of mines must go out of production. Mine output may then be stabilized at a point below requirements of normal domestic consumption.

During the war the Premium Price Plan shielded the domestic consuming industry from restricted output when high cost producers would otherwise have been unable to continue operations. Since there is no subsidy program now in effect, it is possible that consumers may eventually rue the remarkably sharp declines in metals prices.

Monthly Average Prices

• • • **The average prices of the major nonferrous metals in May based on quotations appearing in** THE IRON AGE, **were as follows:**

	Cents Per Pound
Electrolytic copper, Conn. Valley	18.045
Lake copper, Conn. Valley	19.825
Grade A tin, New York	$1.03
Zinc, East St. Louis	11.88
Zinc, New York	12.58
Lead, St. Louis	13.562
Lead, New York	13.72

Nonferrous Metals Prices

	May 25	May 26	May 27	May 28	May 31
Copper, electro, Conn.	17.625	17.625	17.625	17.625	17.625
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	12.85	11.85	11.85	11.85	11.85

Note: Quotations are going prices.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	17.625
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	11.85 to 14.80
Lead, New York	12.00 to 15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$82 to $84
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$72 to $75
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	11.00
Zinc, New York	11.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	14.25*	17.00
No. 120	13.75*	16.50
No. 123	13.25*	16.00
80-10-10 ingot		
No. 305	....	21.75
No. 315	....	18.75
88-10-2 ingot		
No. 210	....	28.50
No. 215	....	25.50
No. 245	17.00*	20.25
Yellow ingot		
No. 405	11.75*	14.50
Manganese bronze		
No. 421	....	19.50

*F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	19.00-19.50
0.60 copper, max.	18.50-19.00
Piston alloys (No. 122 type)	16.00-16.50
No. 12 alum. (No. 2 grade)	15.00-15.50
108 alloy	15.50-16.00
195 alloy	17.00-17.50
13 alloy	18.50-19.00
AXS-679	16.00-16.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	15.75-16.25
Grade 2—92 pct-95 pct	14.75-15.25
Grade 3—90 pct-92 pct	13.75-14.25
Grade 4—85 pct-90 pct	12.75-13.25

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅞
Electrodeposited	28⅞
Rolled, oval, straight, delivered	31.84
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅝
Zinc, oval, 99.886, f.o.b. Detroit	22½
Ball anodes	20½
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbls.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.2¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ½ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅝ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅛ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 55¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅜ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	31.68	....	31.28
Copper, hot-rolled	....	27.53	....
Copper, drawn	....	28.78	....
Low brass	30.17	29.86	33.08*
Yellow brass	29.10	28.79	32.11*
Red brass	30.51	30.20	33.42*
Naval brass	34.15	28.21	29.46
Leaded brass	....	23.69	27.89
Commercial bronze	31.38	31.07	34.04*
Manganese bronze	37.65	31.55	33.05
Phosphor bronze, 5 pct	50.82	51.07	....
Muntz metal	32.18	27.74	28.99
Everdur, Herculoy, Olympic, etc.	36.55	35.47	....
Nickel silver, 10 pct	39.83	42.24	42.41
Architectural bronze	....	....	27.89

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	15½	14¾
Yellow brass	13¼	12⅛
Red brass	14⅝	13⅝
Commercial bronze	14½	13¾
Manganese bronze	13⅛	12¼
Leaded brass rod ends	13	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	13.00
No. 2 copper wire	12.00
Light copper	11.00
Refinery brass	10.50*
Radiators	7.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper, wire	13.00
No. 2 copper, wire	12.00
Light copper	11.00
No. 1 composition	10.00
No. 1 comp. turnings	9.50
Rolled brass	8.25
Brass pipe	9.00
Radiators	8.00
Heavy yellow brass	7.50
Aluminum	
Mixed old cast	8.50
Mixed old clips	8.50
Mixed turnings, dry	7.00
Pots and pans	8.50
Low copper	12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	11 —11¼
No. 2 heavy copper and wire	10 —10¼
Light copper	10 —10¼
Auto radiators (unsweated)	6¼ — 6½
No. 1 composition	8½ — 8¾
No. 1 composition turnings	8¼ — 8½
Clean red car boxes	7½ — 7¾
Cocks and faucets	7½ — 7¾
Mixed heavy yellow brass	6¼ — 6½
Old rolled brass	6¾ — 7
Brass pipe	7¾ — 8
New soft brass clippings	10½ —11
Brass rod ends	7 — 7½
No. 1 brass rod turnings	6 — 6½
Aluminum	
Alum. pistons and struts	4 — 4¼
Aluminum crankcases	6 — 6½
2S aluminum clippings	10 —10½
Old sheet and utensils	6 — 6½
Borings and turnings	3 — 3½
Misc. cast aluminum	6 — 6½
Dural Clips (24S)	6 — 6½
Zinc	
New zinc clippings	5 — 5½
Old zinc	4 — 4½
Zinc routings	3 — 3½
Old die cast scrap	2 — 2½
Nickel and Monel	
Pure nickel clippings	17 —18
Clean nickel turnings	15 —16
Nickel anodes	17 —18
Nickel rod ends	17 —18
New Monel clippings	12½ —13½
Clean Monel turnings	7 — 8
Old sheet Monel	9 —10
Old Monel castings	8 — 9
Inconel clippings	11 —12
Nickel silver clippings, mixed	6½ — 7½
Nickel silver turnings, mixed	6 — 6½
Lead	
Soft scrap, lead	6½ — 7
Battery plates (dry)	3¼ — 3½
Magnesium Alloys	
Segregated solids	9 —10
Castings	5½ — 6½
Miscellaneous	
Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	9 — 9½
Solder joints	10½ —11
Siphon tops	45 —47
Small foundry type	11½ —12
Monotype	9½ —10
Lino. and stereotype	9 — 9½
Electrotype	7 — 7½
New type shell cuttings	9 — 9¼
Hand picked type shells	4½ — 5
Lino. and stereo. dross	5 — 5½
Electro. dross	3½ — 4

Here's a Crane that's Tailor Made for Handling SCRAP!

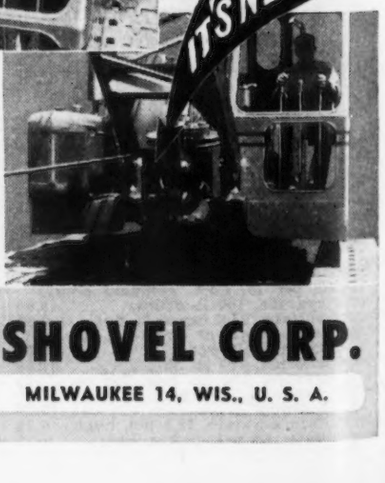
Special Axle:
New type axle has been increased in width and height. Multiple-hinged shoes have been increased in width from 20" to 24". The new UNIT 1020A now has equal stability over both sides and ends. Handles a 45" Magnet with ease.

THE NEWLY DESIGNED UNIT 1020A

With All the Features You Need . . . or Ever Will Need!

- Pendant Boom Suspension . . . boom length can be altered without re-reeving boom hoist cable.
- Throttle Lever is within easy reach of operator . . . positive power and speed control at all times.
- Heavier, air-cooled Double Disc Clutches . . . for smooth performance and easy operation.
- Improved Automatic Traction Brakes with sectional linings which are easily replaced without removing shaft from machine.
- New leak-proof Oil Seals . . . keeps lubricants in . . . and dirt and abrasives out.
- New style foot brakes with self-aligning bearings on brake operating shafts. Wider, self-equalizing brake bands which eliminate dragging or scoring.

Swing Lock Control:
Hand operated swing lock control within easy reach of operator . . . no more stooping, kicking, or leaving cab for this operation.



New Type Magnet Fairlead:
This elevated Fairlead is especially adapted for magnet operation. It equalizes cable contact on two sheaves instead of one, minimizes unnecessary wear.

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Lack of Interest Further Weakens Market

New York

• • • **Scrap prices** this week reflected the same uncertainty and indecision that has existed for the past month. Anticipated consumer buying has not developed and many are out of the market at this time, at least for the month of June. There was very little mill buying in a quiet and indifferent market.

THE IRON AGE scrap composite dropped 33¢ per gross ton to $21.75 per gross ton which is a new low for the year. This represents a drop of $21.25 per gross ton since the first of the year. Prices for No. 1 heavy melting steel this week are: Pittsburgh, $22.50 to $23; Chicago, $21 to $22; and Philadelphia, $20.50 to $21.50.

The weakness this week was reflected noticeably in the Philadelphia market where No. 1 heavy melting steel was off $1.00, and other items as much as $4.00. This weakness was evident in other areas and even at the lower prices there were no large tonnage orders.

Brokers' opinions are divided as to the future trend of the market. Some are doing forward buying in the belief that it will bounce back. Others are very gloomy and can forecast still lower prices, saying that there has only been a temporary halt in the downtrend. The volume of business is definitely down and has been so for quite some time.

There has been talk of stockpiling and some dealers are doing this, but only on a small scale. Others will not stockpile because of the uncertainty which surrounds the future. Foundries which were expected to do some buying have not yet entered the market for any sizable purchases.

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PITTSBURGH — Carnegie-Illinois stepped into the market during the past week with small purchases, holding No. 1 and No. 2 steel at previous quotations. Though small, the tonnage is representative for today's market and helps keep open the sluggish channels of trade. It prevents, or at least postpones, a price drop. This week there is no evidence that anyone in the district will buy shoveling turnings during June.

CHICAGO—Spotty sales continued last week at former prices. At press time there was some question as to whether the May prices on turnings and borings for shipment to Carnegie would be continued as the June price. There is increasing evidence of forward buying by brokers who are buying above consumer prices to obtain material. In cases these prices plus the freight and extra handling means that some scrap men believe the market will bounce at least $6. The only factor which could conceivably cause this to happen would be a prolonged coal strike. Such brokers are in the minority, but the possibility of a coal strike is nevertheless affecting part of the scrap market right now.

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PHILADELPHIA—The scrap market was inactive last week, and brokers dropped their buying prices for open-hearth grades. There was a sale to Birdsboro at $22.50, which establishes a lower price for No. 1 in this market. There was also a sale of No. 2 at $19.50. There has been no business in the turnings market, but there is a growing feeling of weakness in the market. There was a sale of shovelings at $15. Yard cast has been sold at $25, and bought from dealers at $24, although some dealers turned down the business at that price. Heavy breakable is unchanged, but it is on the weak side. Low phos has been moved at $24. In order to protect themselves, brokers are specifying delivery time on railroad lists. One major consumer whose foreign commitments last until the end of the year, is reported to be buying scrap locally again.

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CLEVELAND—In the absence of sales, prices here and in the Valley this week are based on an appraisal of all factors in a nominal market. Blast furnace grades are strong at quoted prices, but otherwise the spotty demand of the past month has given way to what amounts to disinterest on the part of most major consumers. Some dealers are at the point of putting scrap down, but this movement has thus far not materialized to any significant proportions. Plant vacation periods are coming up and some segments of the trade are clinging to their belief that the market here and in the Valley will be weaker before it is stronger.

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CINCINNATI—Scrap shipments are off 40 pct in this district, with one mill holding up shipments and another out of the market. Other consumers are taking blast furnace and a little steel in an otherwise weak and quiet market. Foundries are buying very little and trade sources are beginning to wonder when this segment of the scrap business will again become a big market factor.

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DETROIT—The Detroit scrap situation is badly mixed again this week. While lists being sold on the open market are reported as going at higher prices than a month ago, there are also persistent reports that some dealers are unable to find a home for some of their scrap. Momentarily, the gap between industrial and dealer scrap appears to be widening and reports of reciprocal deals between large scrap sellers and steel mills are increasing. As some sources continue to dry up, plant scrap last month reached probably the greatest volume in the history of the local market. Blast furnace grades are reported to be stronger for the first time in several weeks and cast iron grades are holding at earlier levels.

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NEW YORK—Activity in the market last week was practically at a standstill. Little interest has been shown by the mills to enter the market. The foundries have shown some willingness to make purchases. There has been some stockpiling, but only on a limited scale. One source indicated that some sales have been forced. Quotations are again down with No. 1 heavy melting at $14 to $14.50. Although there was little demand for the cast grades they remained unchanged from last week with the exception of heavy breakable cast which was off 25¢ on the low side.

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ST. LOUIS—One of the steel mills came into the market the latter part of the week for its June commitments for No. 2 heavy melting steel at $2 a ton below the previous quotation, taking a considerable tonnage. Another steel mill, which has orders out at the old price has not come into the market. Bundled sheets, which have sold at the same price as No. 2 heavy melting since the war are back at the normal differential of $2 a ton below No. 2. There is no buying of foundry grades.

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BOSTON—No. 1 steel is quoted at from $14 to $14.50, a bottom price at which it seems stabilized. No. 2 steel has no support and except for some machine shop turnings which are being shipped to Canada, there is no demand. There is a very limited market for No. 1 and No. 2 bundles and cast demand continues very low.

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BIRMINGHAM—The price trend here continues downward with prospective purchasers interested in bargains only. Almost without exception, big scrap consumers in this area remain out of the market. Receipts at dealers' yards still are very light.

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BUFFALO—This area had some small monthly sales to a leading consumer which were under the previous quotations. No. 2 heavy melting sold for $19 and No. 2 bundles for $17. The market was generally very dull with a few transactions. Foundries bought very little scrap during the week. Water movement of scrap into Buffalo continues heavy from Jersey and the Upper Lakes Region.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50 to $23.00
R.R. hvy. melting	24.50 to 25.00
No. 2 hvy. melting	20.50 to 21.00
No. 2 bundles	18.50 to 19.00
RR. scrap rails	26.50 to 27.00
Rails 2 ft and under	32.00 to 32.50
No. 1 comp'd bundles	22.50 to 23.00
Hand bdld. new shts.	20.50 to 21.00
Hvy. steel forge turn	20.50 to 21.00
Mach. shop turn.	14.50 to 15.00
Shoveling turn.	17.50 to 18.00
Mixed bor. and ms. turn.	14.50 to 15.00
Cast iron borings	18.00 to 18.50
No. 1 mach. cast	27.50 to 28.00
Mixed yard cast.	22.00 to 22.50
Hvy. breakable cast.	22.50 to 23.00
Malleable	26.50 to 27.00
RR. knuck. and coup.	27.50 to 28.00
RR. coil springs	27.50 to 28.00
RR. leaf springs	27.50 to 28.00
Rolled steel wheels	27.50 to 28.00
Low phos.	25.00 to 25.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
Factory bundles	21.00 to 22.00
No. 2 dealers' bundles	17.00 to 18.00
Mach. shop turn.	12.00 to 13.00
Short shov. turn.	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Mix. borings and turn.	10.00 to 12.00
Low phos. hvy. forge	25.00 to 25.50
Low phos. plates	24.00 to 24.50
No. 1 RR. hvy. melt	22.50 to 23.50
Rerolling rails	27.00 to 28.00
Miscellaneous rails	25.00 to 26.00
Angles and splice bars	26.00 to 27.00
Locomotive tires, cut	30.00 to 31.00
Cut bolster & side frames	28.00 to 29.00
Standard stl. car axles	27.00 to 28.00
No. 3 steel wheels	24.00 to 25.00
Couplers and knuckles	26.00 to 26.50
Rails, 2 ft and under	30.00 to 31.00
Malleable	24.00 to 25.00
No. 1 mach. cast	27.00 to 28.00
No. 1 agricul. cast.	25.00 to 26.00
Heavy breakable cast.	22.00 to 23.00
RR. grate bars	17.00 to 18.00
Cast iron brake shoes	17.00 to 18.00
Cast iron car wheels	27.00 to 28.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$20.00 to $21.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	19.00 to 20.00
No. 2 bundles	17.00 to 18.00
Mach. shop turn.	9.00 to 10.00
Shoveling turn.	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Mixed bor. and turn.	9.00 to 10.00
Low phos. 18 in. under	26.00 to 27.00
No. 1 cupola cast.	27.00 to 28.00
Hvy. breakable cast.	19.00 to 20.00
Rails 18 in. and under	32.00 to 32.50
Rails random length	22.00 to 23.00
Drop broken	30.00 to 31.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.00 to $14.50
No. 2 hvy. melting	11.50 to 12.50
No. 1 bundles	12.50 to 13.00
No. 2 bundles	10.50
Bushelings	10.00 to 11.00
Shoveling turn.	9.00 to 9.50
Machine shop turn.	5.75 to 6.50
Mixed bor. and turn.	5.00 to 5.50
Cl'n cast chem. bor.	10.00 to 12.00
No. 1 machinery cast.	26.00 to 30.00
No. 2 machinery cast.	22.00 to 24.00
Heavy breakable cast.	17.50 to 18.50
Stove plate	16.00 to 17.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	13.00 to 13.50
No. 1 bundles	16.50 to 17.00
New busheling	15.50 to 16.00
Flashings	15.50 to 16.00
Mach. shop turn.	9.50 to 10.00
Shoveling turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Mixed bor. and turn.	9.50 to 10.00
Low phos. plate	16.50 to 17.00
Heavy breakable cast.	13.00 to 17.00
Stove plate	16.00 to 17.00
Automotive cast.	22.00 to 24.00
No. 1 cupola cast.	19.00 to 23.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.50
No. 2 hvy. melting	18.50 to 19.50
No. 1 bundles	20.50 to 21.50
No. 2 bundles	16.50 to 17.50
Mach. shop turn.	12.00 to 13.00
Shoveling turn.	14.00 to 15.00
Mixed bor. and turn.	10.50 to 11.50
Clean cast chemical bor.	17.00 to 18.00
No. 1 machinery cast.	27.00 to 29.00
No. 1 mixed yard cast.	24.00 to 25.00
Hvy. breakable cast.	27.00 to 28.00
Hvy. axle.forge turn.	19.50 to 20.50
Low phos. acid openhearth	23.00 to 24.00
Low phos. electric furnace	25.00 to 26.00
Low phos. bundles	20.50 to 21.00
RR. steel wheels	24.00 to 25.00
RR. coil springs	24.00 to 25.00
RR. malleable	24.00 to 26.00
Cast iron carwheels	28.00 to 29.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 2 bundled sheets	15.00 to 16.00
Mach. shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Locomotive tires, uncut	23.00 to 24.00
Mis. std. sec. rails	22.00 to 23.00
Steel angle bars	26.00 to 27.00
Rails 3 ft and under	29.00 to 30.00
RR. steel springs	24.00 to 25.00
Steel car axles	25.00 to 27.00
Brake shoes	21.00 to 22.00
Malleable	23.00 to 24.00
Cast iron car wheels	26.00 to 28.00
No. 1 machinery cast	29.00 to 30.00
Hvy. breakable cast.	19.00 to 20.00
Stove plate	20.00 to 21.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy melting	$20.00
No. 2 hvy. melting	20.00
No. 2 bundles	18.00
No. 1 busheling	20.00
Long turnings	14.00
Shoveling turnings	17.00
Cast iron borings	17.00
Bar crops and plate	$24.00 to 25.00
Structural and plate	24.00 to 25.00
No. 1 cupola cast.	27.00 to 28.00
Stove Plate	24.00 to 25.00
No. 1 RR. hvy. melt.	21.00
Steel axles	22.00
Scrap rails	23.00
Rerolling rails	25.00 to 26.00
Angles & splice bars	24.00 to 25.00
Rails 2 ft & under	25.00 to 26.00
Cast iron carwheels	25.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50 to $23.00
No. 2 hvy. melting	19.50 to 20.00
No. 1 bundles	22.50 to 23.00
No. 2 bundles	18.00 to 18.50
Mach. shop turn.	13.50 to 14.00
Short shov. turn.	18.50 to 19.00
Cast iron borings	18.50 to 19.00
Low phos.	23.50 to 24.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.00 to $14.50
No. 2 hvy. melting	12.00 to 12.50
No. 2 bundles	11.00 to 11.50
Mach. shop turn.	6.50 to 7.00
Mixed bor. turn.	6.50 to 7.00
Shoveling turnings	8.50 to 9.00
Machinery cast.	21.00 to 22.00
Mixed yard cast.	19.00 to 20.00
Heavy breakable cast.	20.00 to 21.00
Charging box cast	20.00 to 21.00
Unstrp. motor blks.	15.50 to 16.50
Cl'n cast chem. bor.	11.00 to 13.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00 to $22.50
No. 2 hvy. melting	18.50 to 19.00
No. 1 bundles	18.50 to 19.00
No. 2 bundles	16.50 to 17.00
No. 1 busheling	18.50 to 19.00
Mach. shop turn.	11.00 to 11.50
Shoveling turn.	16.00 to 16.50
Cast iron borings	16.00 to 16.50
Mixed bor. and turn.	16.00 to 16.50
Cupola cast.	29.00 to 30.00
Mixed yard cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Small indus. malleable	20.00 to 21.00
Low phos. plate	22.50 to 23.50
Scrap rails	25.00 to 26.00
Rails 3 ft & under	32.00 to 33.00
RR. steel wheels	28.00 to 29.00
RR. coil & leaf spgs.	28.00 to 29.00
RR. knuckles & coup.	28.00 to 29.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.00
No. 2 hvy. melting	17.00 to 17.50
No. 1 bundles	20.50 to 21.00
No. 2 bundles	16.00 to 16.50
No. 1 busheling	20.50 to 21.00
Drop forge flashings	20.50 to 21.00
Mach. shop turn.	12.50 to 13.00
Shoveling turn.	18.00 to 18.50
Steel axle turn.	19.50 to 20.00
Cast iron borings	18.00 to 18.50
Mixed bor. & turn.	18.00 to 18.50
Low phos. 2 ft and under	23.00 to 23.50
No. 1 mach. cast	28.00 to 29.00
Malleable	22.00 to 23.00
RR. cast.	28.00 to 29.00
Railroad grate bars	20.00 to 21.00
Stove plate	20.00 to 21.00
RR. hvy. melting	21.00 to 22.00
Rails 3 ft and under	30.00 to 31.00
Rails 18 in. and under	31.00 to 32.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	28.00
No. 1 cupola cast.	$20.00 to 25.00
RR. hvy. melting	20.00
Rails	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$24.00 to 26.00
RR. hvy. melting	20.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy melt	$20.00
No. 1 & No. 2 bales	16.00
No. 3 bales	13.00
Elec. fur. 1 ft and under	30.00
No. 1 cupola cast.	$28.00 to 30.00
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechnical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00
No. 2 cast.	44.00 to 45.00

*Ceiling Price.

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 31, 1949	May 24, 1949	May 3, 1949	June 1, 1948
Hot-rolled sheets	3.25	3.25	3.25	2.775
Cold-rolled sheets	4.00	4.00	4.00	3.495
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.913
Hot-rolled strip	3.25	3.25	3.25	2.775
Cold-rolled strip	4.038	4.038	4.038	3.535
Plates	3.40	3.40	3.40	2.93
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.70
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	5.90
Special coated mfg. ternes	6.65	6.65	6.65	5.80
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	2.875
Cold-finished bars	3.995	3.995	3.995	3.483
Alloy bars	3.75	3.75	3.75	3.213
Structural shapes	3.25	3.25	3.25	2.767
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.608
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.725
Light rails	3.55	3.55	3.55	3.05
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.133
Skelp	3.25	3.25	3.25	2.888

Pig Iron: (per gross ton)	May 31, 1949	May 24, 1949	May 3, 1949	June 1, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$44.74
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	45.47	45.47	46.80	45.47
No. 2, Birmingham	39.38	39.38	40.71	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	39.00
Basic del'd Philadelphia*	49.74	49.74	49.74	44.24
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	65.55
Ferromanganese‡	173.40	173.40	173.40	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.
* Does not include interim increase on total freight charges effective Jan. 11, 1949.

Scrap (per gross ton)	May 31, 1949	May 24, 1949	May 3, 1949	June 1, 1948
Heavy melt'g steel, P'gh.	$22.75	$22.75	$23.75	$40.25
Heavy melt'g steel, Phila.	*21.00*	22.00	22.00	42.50
Heavy melt'g steel, Ch'go	21.50	21.50	23.50	39.25
No. 1, hy. comp. sh't, Det.	16.75	16.75	16.75	35.50
Low phos. Young'n	*23.75*	24.75	24.75	45.25
No. 1, cast, Pittsburgh	27.75	27.75	28.50	64.00
No. 1, cast, Philadelphia	28.00	28.00	28.00	67.00
No. 1, cast, Chicago	27.50	27.00	29.00	71.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.50	$12.50
Foundry coke, prompt	16.25	16.25	16.50	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	*17.625*	18.00	18.50	21.50
Copper, Lake Conn.	18.625	18.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	11.00	11.00	12.50	12.00
Lead, St. Louis	*11.85*	12.85	14.80	17.30
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00

Composite Prices . .

Starting with the issue of May 12, 1949 the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive, see p. 139 of May 12, 1949 issue. The composite under the old method this week would have been 3.73330¢ per lb.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
May 31, 1949	3.705¢ per lb.	$45.91 per gross ton	*$21.75* per gross ton
One week ago	3.705¢ per lb.	$45.91 per gross ton	$22.08 per gross ton
One month ago	3.705¢ per lb.	$46.13 per gross ton	$23.08 per gross ton
One year ago	3.211¢ per lb.	$40.51 per gross ton	$40.66 per gross ton

	HIGH		LOW		HIGH	LOW	HIGH	LOW
1949	3.720¢ Jan. 1		3.705¢ May 3		$46.82 Jan. 4	$45.91 May 10	$43.00 Jan. 1	$21.75 May 31
1948	3.721¢ July 27		3.193¢ Jan. 1		46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29		2.848¢ Jan. 1		37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31		2.464¢ Jan. 1		30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29		2.396¢ Jan. 1		25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢		2.396¢		$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢		2.396¢		23.61	23.61	$19.17	$19.17
1942	2.396¢		2.396¢		23.61	23.61	19.17	19.17
1941	2.396¢		2.396¢		$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2		2.24107¢ Apr. 16		23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3		2.26689¢ May 16		22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4		2.27207¢ Oct. 18		23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9		2.32263¢ Jan. 4		23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28		2.05200¢ Mar. 10		19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1		2.06492¢ Jan. 8		18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24		1.95757¢ Jan. 2		17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3		1.75836¢ May 2		16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5		1.83901¢ Mar. 1		14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13		1.86586¢ Dec. 29		15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.31773¢ May 28		2.26498¢ Oct. 29		18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Widths up to 12-in. inclusive. (2) 0.25 carbon and less. (3) Cokes, 1.25 lb, deduct 25¢ per base box. (4) 18 gage and heavier. (5) For straight length material only from producers to fabricators. (6) Also shafting. For quantities of 40,000 lb and over. (7) Carload lot in manufacturing trade. (8) Hollowware enameling, gages 29 to 31 only. (9) Produced to dimensional tolerances in AISI Manual Sec. 6. (10) Slab prices subject to negotiation in most cases. (11) San Francisco only. (12) Los Angeles only. (13) San Francisco and Los Angeles only. (14) Seattle only. (15) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[10]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[11] 4.20[12]	
SHEETS Hot-rolled[4]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken, Pa. 3.35)	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95[13]	4.15
Cold-rolled	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[13]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[1]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.65
Cold-rolled[2]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.25			5.55
TINPLATE Cokes, 1.50 lb.[3] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. = $8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[8]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05	4.00
Reinforcing (billet)[5]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[6]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[12]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[9]	3.40	3.40	3.40	3.40	3.40	3.45 Conshohocken =3.55	3.40	3.45 Coatesville =3.50, Claymont =3.65 Geneva =3.40, Harrisburg =3.95				3.65	3.45	4.30[14]	4.35
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville =4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.80 to 3.90[14]	3.80
MANUFACTURERS' WIRE[7] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[11]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-5.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel							Straight Chromium		
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	38.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, f.o.b. Butler, Pa.		7.75

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic, Sharon*	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes, Sharon*
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.45
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.30
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

*Sheets and strip.

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
½-in.	43 to 41	25½ to 23½
¾-in.	46 to 44	29½ to 27½
1-in.	48½ to 46½	32½ to 30½
1¼-in.	49 to 47	33 to 31
1½-in.	49½ to 47½	33½ to 31½
2-in.	50 to 48	34 to 32
2½ to 3-in.	50½ to 48½	34½ to 32½
Steel, lapweld		
2-in.	39½	25 to 23
2½ to 3-in.	43½ to 42½	27 to 26
3½ to 6-in.	46½ to 42½	30 to 26
Steel, seamless		
2-in.	38½ to 27	22 to 10½
2½ to 3-in.	41½ to 32½	25 to 16
3½ to 6-in.	43½ to 38½	27 to 22
Wrought Iron, buttweld		
½-in.	+20½	+47
¾-in.	+10½	+36
1 & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	26 to 24
¾-in.	46 to 44	30 to 28
1-in.	48 to 46	33 to 31
1¼-in.	48½ to 46½	33½ to 31½
1½-in.	49 to 47	34 to 32
2-in.	49½ to 47½	34½ to 33½
2½ to 3-in.	50 to 48	35 to 33
Steel, lapweld		
2-in.	39½ to 38½	24 to 23
2½ to 3-in.	44½ to 42½	29 to 27
3½ to 6-in.	48 to 44	32½ to 30½
Steel, seamless		
2-in.	37½ to 32½	22 to 17
2½ to 3-in.	41½ to 36½	26 to 22
3½ to 6-in.	45	29½
Wrought Iron, buttweld		
½-in.	+16	+40
¾-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$95.70
6 to 24-in., del'd N. Y.	$92.50 to 97.40
6 to 24-in., Birmingham	82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment: rail and water shipment less	109.30

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	27
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)

	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	38

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00 to 31.00¢
Antimony	51.17¢
Brass, 10 ton lots	22.75 to 25.75¢
Copper, electrolytic	28.125¢
Copper, reduced	28.00¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$2.50
Lead	20.22¢
Manganese	55.00 to 60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	14.75 to 16.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	Std. ⅜-in. grains
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.7

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.05	....	6.45	5.05	6.68	5.25	5.00	5.00	6.68	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.43-7.57	5.30	7.27	5.35	5.10	5.05-5.15	5.90	9.60-9.70	9.85-9.95	11.15	11.40-11.45
Chicago	4.85	5.75	6.95-7.10	4.85	5.55-6.68	5.10	4.90	4.90	5.70	8.90	9.26	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.85-5.16	5.75-6.06	6.15-7.46	5.03-5.15	....	5.21-5.54	5.01-5.47	5.01-5.34	5.70-5.97	9.49-9.50	9.74-9.75	10.95	11.19-11.20
Detroit	5.28-5.32	6.07-6.18	7.38-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.10	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	5.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Los Angeles	6.45	7.80[19]-7.90[1]	8.05	6.65	8.35[5]	6.15	5.95	6.10	7.95[14]	10.95[15]	10.90[15]-14.70	12.45[15]	12.70[15]-16.45
Memphis	5.75-5.80	6.60	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.13-7.18	5.03-5.38	6.86	5.28	5.08	5.08	5.88	9.53	9.78	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31-6.46	7.00	5.62-5.72	....	5.70	5.33	5.57	6.36-6.41	9.73	9.98	11.18	11.43
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.08	6.24[12]	6.73	5.45	6.69	5.38	5.10	5.40	6.19	9.70	9.75	10.95	11.20
Pittsburgh	4.85	5.75[1]	6.95-7.32	5.00	6.00	5.05-5.10	4.90	4.90	5.65	9.35	9.60	10.80	11.05
Portland	6.50[8]-6.90	8.00[1]	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.25[3]	8.20	8.80-9.30	7.65[3]	....	6.10[3]	5.70[3]	6.95[8]	8.30	....	....	....	....
San Francisco	6.15[8]-7.15	7.50[2]	7.90	6.75[8]	8.25[5]	6.30-6.35[8]	5.90[8]	5.90[8]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12[1]-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	6.07-6.22	9.27-9.72	9.57-9.97	10.62-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.29	9.49	9.79	10.84	11.14

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1499 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	52.50	53.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Provo, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	.....	.....	.....	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	52.50	53.00	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	.....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	.....	.....	.....
Jersey City	Steelton	3.67	.....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13	53.63	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
Seattle	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†			

† Low Phos, Southern Grade

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn; penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, $80.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25%Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.25
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per lb. of alloy, del

Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot	$1.30
F.o.b. Wash., Pa.; 100 lb. and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.62½¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25

Rotary Electric Nears Expansion Completion At Cost of $5 Million

Detroit

• • • **A second important** addition to Detroit's growing electric steel-melting capacity was disclosed officially recently when Rotary Electric Steel Co. confirmed reports that the company was nearing completion of its $5 million expansion program.

Installation of a fifth 60-ton Pittsburgh electric furnace brings Rotary's capacity to 420,000 ingot tons annually, an increase of 260,000 tons since 1944. The two 60-ton furnaces added by Rotary during the past few months are top charging units. It is expected that substantial savings in heat time will be realized as the result of top charging the new furnaces.

Rotary's program for increasing its rolling capacity includes the installation of a 30-in. mill, rebuilding of a 28-in. blooming mill, installation of a new 36-in. blooming mill rated at 60,000 tons per month and the complete rebuilding of its bar mill. The 30-in. mill, already installed and in operation, is now being used for the production of sheet bar. This unit, according to present planning, will continue to be available for the production of sheet bars; it will also become an integral part of the new bar mill.

The company's 28-in. blooming mill, of the reversing type, has been completely rebuilt. The 36-in. mill is scheduled for completion in June, according to N. D. Devlin, president. The new mill will handle ingots up to 25 in. whereas previously Rotary has been limited to ingots up to 18 in. maximum dimension.

Extensive changes are planned in Rotary's soaking pits, including the installation of six new units at ground level that will obsolete the present batch-type facilities.

Plans for completing the bar mill have not been announced. The bar mill program is scheduled for completion late this year.

To **provide** for its new furnaces, Rotary has added 80 ft to its melt shop. A new building for conditioning molds has been built. Additional cranes and scrap handling equipment have been purchased. Rotary has also bought additional diesel locomotives and has added many feet of track to its railroad facilities.

Using its newest facilities, Rotary is able to charge up to 25,000 lb in a single scrap box through the open top of the furnace. Under favorable scrap conditions four such charges plus minor door-charged additions are sufficient for a heat, according to Rotary officials.

In the near future the company expects to furnish special forging billets, standard billets and bar products to the trade. This will be done as rapidly as conditions permit, according to Mr. Devlin. The exact range of the company's bar products has not been determined but plans have been made to broaden substantially the company's prewar offerings to the trade. Prior to rebuilding its bar mills, Rotary was producing bar products in the range of ½ to 4½ in.

Since the predecessor company of the same name was established in 1933, Rotary has, with the exception of a brief period following the war, operated at substantially 100 pct of capacity. Operations are presently on a basis of three turns, 5 days per week. Approximately 500 workers are employed. It is expected that several hundred new workers will have to be added when the new bar mill facilities are operating.

With its larger, modernized plant and a greater range of products than ever before, Rotary hopes to be in an advantageous position to serve the automotive and allied industries. Sales offices maintained in other industrial areas before the war will remain closed for the present, it was disclosed.

Moves Record Tonnage

Dallas

• • • **Lone Star Steel** set a new record during the month of April by shipping 915 rail cars of products from the Lone Star, Tex., plant. Included in this figure were 37,901 gross tons of pig iron, this represents a shipment of 1263 gross tons of pig iron each day during the month. According to George Ramsey, vice-president in charge of operations, these figures represent the largest movement of products in any one month of the company's history.

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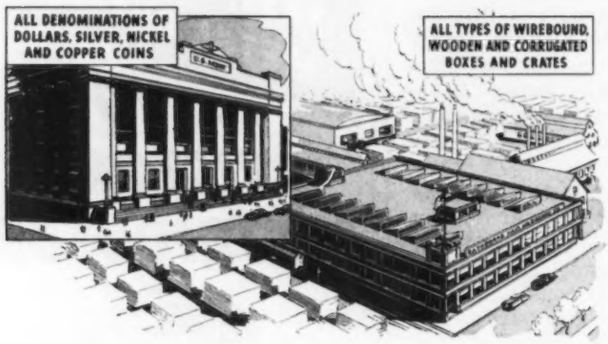

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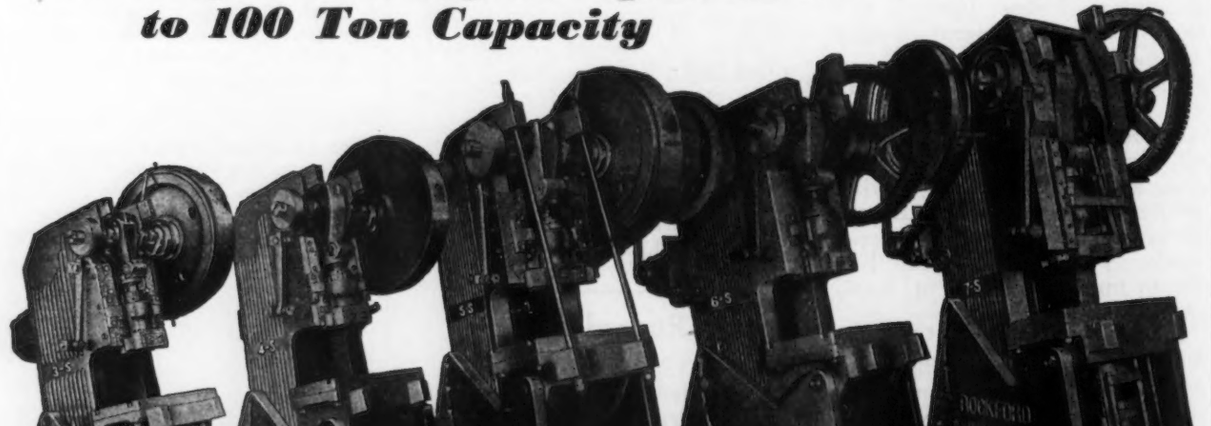

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